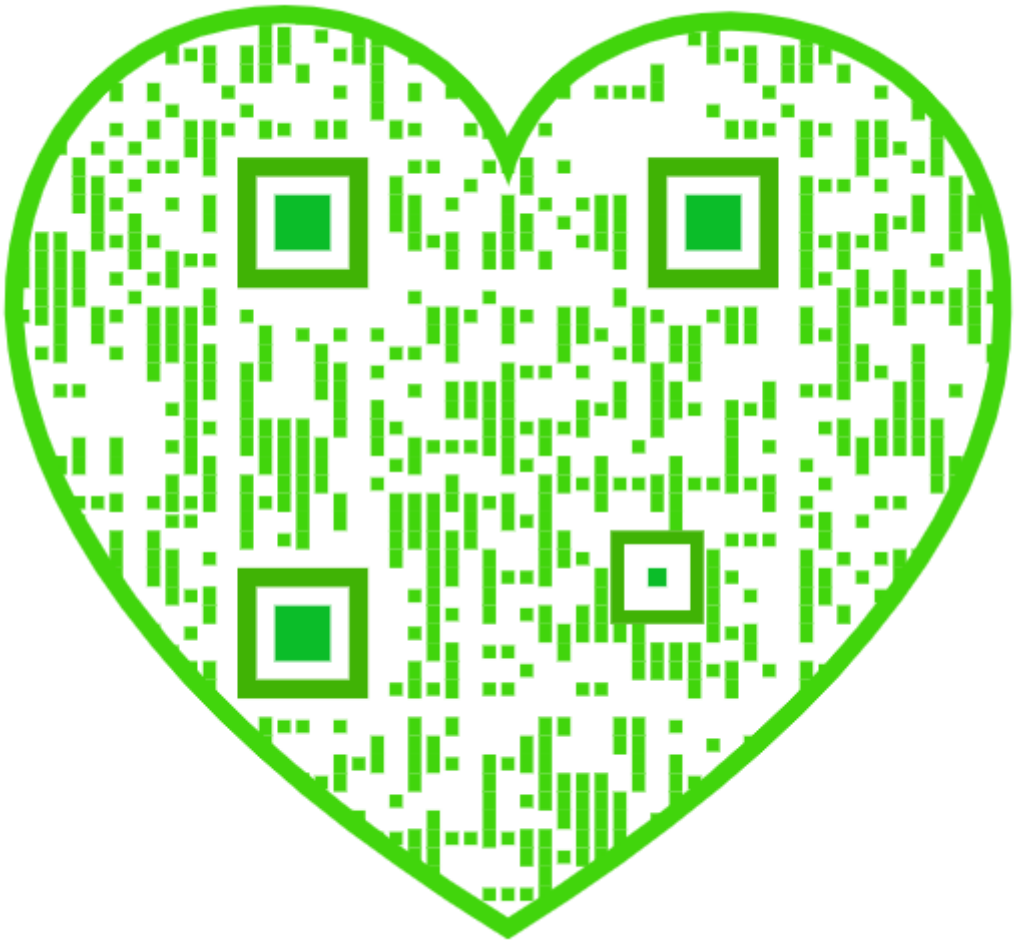

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AUGUST 1914

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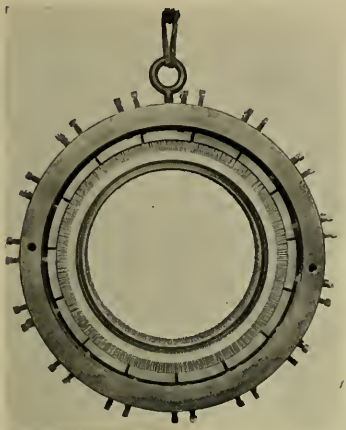

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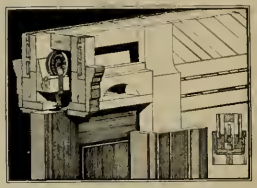

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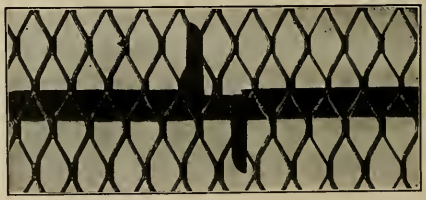

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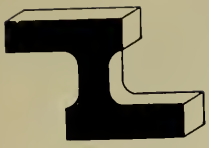

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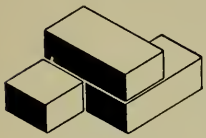
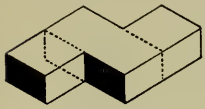
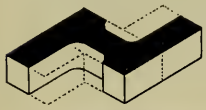


OF TWO STRETCHER BRICKS CONNECTED BY A HEADER



WITH THE HEADER SUNK DOWN INTO THE STRETCHERS AND



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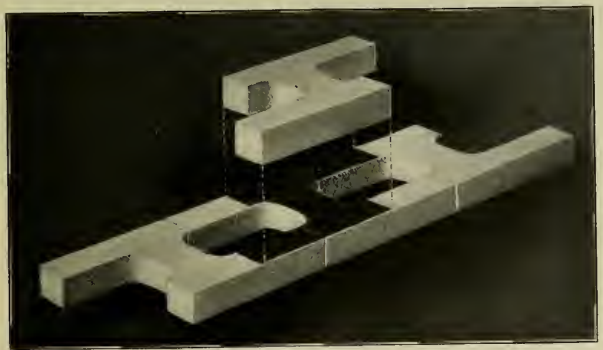

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"Golden Gate," manufactured by Pacific Portland Cement Co., Pacific Bldg., San Francisco.

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Jones-Duncan Co., successors to American Paint & Dry Color Co., 414 Ninth St., San Francisco.
Bay State Brick and Cement Coating, made by Wadsworth, Howland & Co. (See distributing Agents on page 32.)
Biturine Co., of America, 24 California St., San Francisco.
Hercules Waterproofing, manufactured by Hercules Waterproofing Cement Co., Buffalo, N. Y. Distributors: Pacific Building Materials Co., 523 Market St., San Francisco.
Liquid Stone Paint Co., Hearst Building, San Francisco.
Concrete Cement Coating, manufactured by the Muralo Company. (See full-page advertisement, color insert.)
Imperial Waterproofing, manufactured by Imperial Co., 183 Stevenson St., San Francisco.
Trus-Con Par-Seal, made by Trussed Concrete Steel Co. (See Adv. for Coast agencies.)
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Concrete Cement Coating, manufactured by the Muralo Company. (See afull-page advertment, color insert.)
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Bay State Brick and Cement Coating, made by Wadsworth, Howland & Co. (See list of Distributing Agents on page 31.)

CEMENT FLOOR COATING—Continued.
Glidden's Concrete Floor Dressing, sold on Pacific Coast by Whittier, Coburn Company, San Francisco, and Tibbetts-Oldfield Co., Los Angeles.
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Giant Stationary Suction Cleaner, San Francisco and Oakland.

CONCRETE CONSTRUCTION
American Concrete Co., Humboldt Bank Bldg., San Francisco.
Bluxome & Co., Monadnock Bldg., San Francisco.
Clinton Fireproofing Co., Mutual Bank Bldg., San Francisco.
"Mushroom" System of Concrete Flat Slab Construction, Industrial Engineering Co., Clunie Bldg., San Francisco.
McKibben & Taylor, 2125 Shattuck Ave., Berkeley.
Otto, W. H., 269 Park Ave., San Jose.
Barrett & Hilp, Sharon Bldg., San Francisco.
Foster, Vogt Co., Sharon Bldg., San Francisco.
P. A. Palmer, Monadnock Bldg., San Francisco.
Petersen, H. L., 62 Post St., San Francisco.
A. Lynch, 185 Stevenson St., San Francisco.
Ransome Concrete Co., Oakland and Sacramento.
F. J. R. Rickon, 1859 Geary St., San Francisco.

CONCRETE MIXERS
Austin Improved Cube Mixer, Pacific Coast Offices, 338 Brannan St., San Francisco; the Beebe Company, Portland and Seattle, and P. B. Eneh, Los Angeles.
Foote Mixers sold by Edw. R. Bacon, 40 Natoma St., San Francisco.
Koehring Mixer, sold by Harron, Rickard & McCone, San Francisco.

Specify... **For Plastering**
HOLMES DIAMOND SANTA CRUZ LIME
PHONE SUTTER 2202
Guaranteed Against Pitting or Popping
Holmes Lime & Cement Co.
600 Postal Telegraph Bldg., San Francisco

ARCHITECTS' SPECIFICATION INDEX—*Continued*

CONCRETE PILES
Harron, Rickard & McCone, San Francisco and Los Angeles.

CONCRETE POURING APPARATUS
Concrete Appliances Co., Los Angeles; Parrott & Co., Coast Representatives, San Francisco, Portland, Seattle.

CONCRETE REINFORCEMENT
United States Steel Products Co., San Francisco, Los Angeles, Portland and Seattle.
Clinton Welded Reinforcing System, L. A. Norris, Monadnock Bldg., San Francisco.
"Kahn System," see advertisement on page 158, this issue.
International Fabric & Cable, represented by Western Builders' Supply Co., 155 New Montgomery St., San Francisco.
Triangle Mesh Fabric, Sales Agents, Pacific Building Materials Co., 523 Market St., San Francisco.
Twisted Bars, sold by Woods & Huddart, 444 Market St., San Francisco.

CONCRETE SURFACING
"Biturine," sold by Biturine Co. of America, 24 California St., San Francisco.
"Concreta" sold by W. P. Fuller & Co., San Francisco.
Wadsworth, Howland & Co.'s Bay State Brick and Cement Coating, sold by R. N. Nason & Co., San Francisco and Los Angeles.
Liquid Stone Paint Co., Hearst Bldg., San Francisco.
Glidden Liquid Cement, manufactured by Glidden Varnish Co., Whittier, Coburn Co., San Francisco, and Tibbetts-Oldfield Co., Los Angeles.
Moller & Schumann, 1023 Mission St., San Francisco.

CONTRACTORS, GENERAL
American Concrete Co., Humboldt Bank Bldg., San Francisco.
Foster, Vogt Co., Sharon Bldg., San Francisco.
M. Fisher, California-Pacific Bldg., San Francisco.
Herman T. Ludwig, 24 California St., San Francisco.
Howard S. Williams, Hearst Bldg., San Francisco.
Graham & Jensen, Maskey Bldg., San Francisco.
Monson Bros., 1907 Bryant St., San Francisco.
Ransome Concrete Co., 1218 Broadway, Oakland.
F. J. Rickon, C. E., 1859 Geary St., San Francisco.
Williams Bros. & Henderson, Holbrook Bldg., San Francisco.
Burt T. Owsley, 311 Sharon Bldg., San Francisco.
L. A. Rose, Monadnock Bldg., San Francisco.
Patrick-Nelson Company, 2011 Shattuck Ave., Berkeley, Cal.

CONTRACTORS, GENERAL—Continued.
Sound Construction Co., Hearst Building, San Francisco.
Barrett & Hilp, Sharon Bldg., San Francisco.

CORK TILING
David J. E. Kennedy, Inc., Sharon Bldg., San Francisco.

CORNER BAR
Dolbear Curb Bar, manufactured by American Steel Bar Co., 1034 Merchants Exchange Bldg., San Francisco.
Wainwright Steel Corner Bar, made by Steel Protected Concrete Co., Philadelphia, Pa.

CORNER BEAD
United States Metal Products Co., 525 Market St., San Francisco.; 750 Keller St., San Francisco.

CRUSHED ROCK
Grant Gravel Co., Flat Iron Bldg., San Francisco.
Niles Rock, sold by California Building Material Company, Pacific Bldg., San Francisco.
Niles Sand, Gravel & Rock Co., Mutual Bank Bldg., San Francisco.

DAMP-PROOFING COMPOUND
Biturine Co. of America, 24 California St., San Francisco.
Glidden's Liquid Rubber, sold on Pacific Coast by Whittier, Coburn Company, San Francisco, and Tibbetts-Oldfield Co., Los Angeles.
Hercules Waterproofing, manufactured by Hercules Cement Co., Buffalo, N. Y. Distributors: Pacific Building Materials Co., 523 Market St., San Francisco.
Imperial Co., 183 Stevenson St., San Francisco.
Lithoid Product Co., Merchants Exchange Bldg., San Francisco.
Trus-Con Damp Proofing. (See advertisement of Trussed Concrete Steel Company for Coast agencies.)
"Pabco" Damp Proofing Compound, sold by Paraffine Paint Co., 34 First St., San Francisco.
Liquid Stone Paint Co., Hearst Bldg., San Francisco.
Wadsworth, Howland & Co., Inc., 84 Washington St., Boston. (See Adv. for Coast agencies.)

DOOR HANGERS
McCabe Hanger Mfg. Co., New York, N. Y.
Pitcher Hanger, sold by National Lumber Co., Fifth and Bryant Sts., San Francisco.
Reliance Hanger, sold by Sartorius Co., San Francisco; D. F. Fryer & Co., Louis R. Bedell, Los Angeles, and Portland Wire & Iron Works.

DUMB WAITERS
Spencer Elevator Company, 173 Beale St., San Francisco.
Burdett-Rowntree Mfg. Co., Underwood Bldg., San Francisco.

The B. & W. Stationary Vacuum Cleaner

For Bungalows and Moderate Sized Houses

PRICE $100.00 INSTALLED

High efficiency and costs less than 3c per hour to operate. Made in San Francisco.
For demonstration see

ARTHUR T. RIGGS

510 Claus Spreckels Building San Francisco

PHONE GARFIELD 7189

"FIBRESTONE"

SANITARY FLOORING, WAINSCOT AND BASE. **Laid Exclusively by**
FIBRESTONE & ROOFING CO., 971 Howard St. **San Francisco Tel. Sutter 329**

ARCHITECTS' SPECIFICATION INDEX—*Continued*

ELECTRICAL CONTRACTORS
Butte Engineering Co., 683 Howard St., San Francisco.
Central Electric Co., 185 Stevenson St., San Francisco.
Scott Co., Inc., 243 Minna St., San Francisco.
Pacific Fire Extinguisher Co., 507 Montgomery St., San Francisco.

ELECTRICAL ENGINEERS
Albert E. Noble, 173 Jessie St., San Francisco.
Chas. T. Phillips, Pacific Bldg., San Francisco.

ELECTRIC PLATE WARMER
The Prometheus Electric Plate Warmer for residences, clubs, hotels, etc. Sold by M. E. Hammond, Humboldt Bank Bldg., San Francisco.

ELEVATORS
Otis Elevator Company, Stockton and North Point, San Francisco.
Spencer Elevator Company, 126 Beale St., San Francisco.
San Francisco Elevator Co., 860 Folsom St., San Francisco.
Pacific Gurney Elevator Co., 186 Fifth St., San Francisco.
Van Emon Elevator Co., Natoma St., San Francisco.

ELEVATORS, SIGNALS, FLASHLIGHTS AND DIAL INDICATORS
Elevator Supply & Repair Co., Underwood Bldg., San Francisco

ENGINEERS
F. J. Amweg, 700 Marston Bldg., San Francisco.
W. W. Breite, Clunie Bldg., San Francisco.
L. M. Hausmann, Sharon Bldg., San Francisco.
Chas. T. Phillips, Pacific Bldg., San Francisco.
Hunter & Hudson, Rialto Bldg., San Francisco.

EXIT DEVICES
Von Duprin Self-Releasing Fire Exit Devices, manufactured by Vonnegut Hardware Co. (See Adv. for Coast Distributors.)

EXPRESS CALL SYSTEM
Elevator Supply & Repair Co., Underwood Bldg., San Francisco.

FIRE EXIT DEVICES
Von Duprin Self-Releasing Fire Exit Devices. Vonnegut Hardware Co. (See Adv. for Coast Agencies.)

FIRE ESCAPES
Pacific Structural Iron Works, Structural Iron and Steel, Fire Escapes, etc. Phone Market 1374; Home J. 3435. 370-84 Tenth St., San Francisco.
Western Iron Works, 141 Beale St., San Francisco.

FIRE EXTINGUISHERS
Scott Company, 243 Minna St., San Francisco.
Pacific Fire Extinguisher Co., 507 Montgomery St., San Francisco.
Levensaler-Spier Corporation, Monadnock Bldg., San Francisco.

FIRE BRICK
Livermore Fire Brick Co., Livermore, Cal.

FIREPLACE DAMPER
Head, Throat and Damper for open fireplaces, Colonial Fireplace Co., Chicago. (See advertisement for Coast agencies.)

FIREPROOFING AND PARTITIONS
Gladding, McBean & Co., Crocker Bldg., San Francisco.
Los Angeles Pressed Brick Co., Frost Bldg., Los Angeles.
The Jackson Fireproof Partition Co., Levensaler-Spier Corporation, Distributors, Monadnock Bldg., San Francisco.

FIREPROOF PAINT
Liquid Stone Paint Co., Hearst Bldg., San Francisco.
Glidden Products, sold by Whittier-Coburn Co., San Francisco, and Tibbetts-Oldfield Co., Los Angeles.

FIXTURES—BANK, OFFICE, STORE, ETC.
A. J. Forbes & Son, 1530 Filbert St., San Francisco.
Fink & Schindler, 218 13th St., San Francisco.
C. F. Weber & Co., 365 Market St., San Francisco and 210 N. Main St., Los Angeles, Cal.
T. H. Meek Co., 1157 Mission St., San Francisco.

FLOOR VARNISH
Bass-Hueter and San Francisco Pioneer Varnish Works, 816 Mission St., San Francisco.
R. N. Nason & Co., 151 Potrero Ave., San Francisco.
Standard Varnish Works, Chicago, New York and San Francisco.
Moller & Schumann Co., 1022 Mission St., San Francisco.
Glidden Products, sold by Whittier-Coburn Co., San Francisco, and Tibbetts-Oldfield Co., Los Angeles.

FLOORS—CORK
Nonpareil Cork Tiling, David E. Kennedy, Inc., N. Y. Distributor for the Pacific Coast: G. H. Freear, Sharon Bldg., San Francisco.

FLOORING—MAGNESITE
Fibrestone & Roofing Co., 971 Howard St., San Francisco.

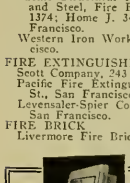
FLUMES
California Corrugated Culvert Co., West Berkeley, Cal.

GARAGE EQUIPMENT
Bowser Gasoline Tanks and Outfit. Bowser & Co., 612 Howard St., San Francisco.
Compressed Air & General Machinery Co., 39 Stevenson St., San Francisco.

GLASS
W. P. Fuller & Company, all principal Coast cities.
Whittier-Coburn Co., Howard & Beale Sts., San Francisco.

GRANITE
California Granite Co., Sharon Bldg., San Francisco.

GRAVEL, SAND AND CRUSHED ROCK
Bay Development Co., 153 Berry St., San Francisco
California Building Material Co., Pacific Bldg., San Francisco.
Del Monte White Sand, sold by Pacific Improvement Co., Crocker Bldg., San Francisco.



"White-Steel" Medicine Cabinets and Mirrors are the last word in Sanitary Bathroom Equipment. See Sweet's 1914 Catalog, Pages 1054-1055 or write for full information.

"WHITE-STEEL" SANITARY FURNITURE CO.
Grand Rapids, Michigan

Northern California
Johnson-Locke Mercantile Co.
San Francisco, Calif.

Southern California
H. R. Boynton Company
Los Angeles, Calif.

CLARENCE E. MUSTO, Pres. JOSEPH B. KEENAN, Vice-Pres. GUIDO J. MUSTO, Sec'y & Treas.

JOSEPH MUSTO SONS-KEENAN CO.

Phone Franklin 6365 — **MARBLE**

OFFICE AND MILLS: 535-565 North Point St., SAN FRANCISCO, CAL.

ARCHITECTS' SPECIFICATION INDEX—*Continued*

GRAVEL, SAND, CRUSHED ROCK—Continued.
Pratt Building Material Co., Hearst Bldg., San Francisco.
Grant Gravel Co., Flatiron Bldg., San Francisco.
Niles Sand, Rock & Gravel Co., 971 Howard St., San Francisco.

HARDWALL PLASTER
Henry Cowell Lime & Cement Co., San Francisco.
American Keene Cement Co., 333 Monadnock Bldg., San Francisco.

HARDWARE
Russwin Hardware, Joost Bros., San Francisco.
Western Brass Mfg. Co., 217 Tehama St., S. F.

HARDWOOD FLOORING
Parrott & Co., 320 California St., San Francisco
White Bros., Cor. Fifth and Brannan Sts., San Francisco.
Hardwood Interior Co., 554 Bryant St., San Francisco.

HARDWOOD LUMBER
Dieckmann Hardwood Co., Beach and Taylor Sts., San Francisco.
Parrott & Co., 320 California St., San Francisco.
White Bros., Cor. Fifth and Brannan Sts., San Francisco.

HEATERS—AUTOMATIC
Pittsburg Water Heater Co., 237 Powell St., San Francisco.
Hoffman Heaters, factory branch, San Francisco.

HEATING EQUIPMENT—VACUUM, ETC.
Edward Stephenson, 618 Monadnock Bldg., San Francisco.

HEATING AND VENTILATING
J. M. Boscus, 975 Howard St., San Francisco.
Fess System Co., 220 Natoma St., San Francisco.
Mangrum & Otter, Inc., 507 Mission St., San Francisco.
Scott Company, 243 Minna St., San Francisco.
Wittman, Lyman & Co., 341 Minna St., San Francisco.
Pacific Fire Extinguisher Co., 507 Montgomery St., San Francisco.
Petersen-James Co., 710 Larkin St., San Francisco.

HOLLOW BLOCKS
Denison Hollow Interlocking Blocks, Monadnock Bldg., San Francisco, and Chamber of Commerce Bldg., Portland.

INGOT IRON, SHEETS, PLATES, ETC.
American Rolling Mill Co., Middleton, Ohio.
California Corrugated Culvert Co., 5th and Parker Sts., West Berkeley.

INSPECTIONS AND TESTS
Robert W. Hunt & Co., 251 Kearny St., San Francisco.

IRRIGATION GATES, SUPPLIES, ETC.
California Corrugated Culvert Co., West Berkeley, Cal.

IRON PAINT
Gobeen Mfg. Company, Canton, Ohio.

JOIST HANGERS
Western Builders' Supply Co., 155 New Montgomery St., San Francisco.

KEENE CEMENT
American Keene Cement Co., Monadnock Bldg., San Francisco.

LIME
Holmes Lime and Cement Co., Postal Telegraph Bldg., San Francisco.
Henry Cowell Lime & Cement Co., 9 Main St., San Francisco.

LIGHT, HEAT AND POWER
Pacific Gas & Elec. Co., 445 Sutter St., San Francisco.

LUMBER
Dudfield Lumber Co., Palo Alto, Cal.
Sunset Lumber Co., Oakland, Cal.
Santa Fe Lumber Co., Seventeenth and De Haro Sts., San Francisco.

MAIL CHUTES
Cutler Mail Chute Co., Rochester, N. Y. (See Adv. on page 38 for Coast representatives.)

MANTELS
Mangrum & Otter, 561 Mission St., San Francisco.

MARBLE
Columbia Marble Co., 268 Market St., San Francisco.
Joseph Musto Sons-Keenan Co., 535 North Point St., San Francisco.

MEDICINE CABINETS
White Steel Sanitary Furniture Co., rep. by Johnson-Locke Mercantile Co., San Francisco.

METAL AND STEEL LATH
Jackson Fireproof Partition Co., Levensaler-Spiel Corporation, distributors, Monadnock Bldg., San Francisco.
L. A. Norris & Co., Monadnock Bldg., San Francisco.
Pratt Building Material Co., Hearst Bldg., San Francisco.

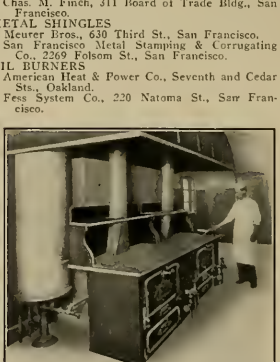
METAL CEILINGS
San Francisco Metal Stamping & Corrugating Co., 2269 Folsom St., San Francisco.

METAL DOORS AND WINDOWS
U. S. Metal Products Co., 525 Market St., San Francisco.
Dahlstrom Metallic Door Co., Western office, with M. G. West Co., 353 Market St., San Francisco.

METAL FURNITURE
M. G. West Co., 353 Market St., San Francisco.
Chas. M. Finch, 311 Board of Trade Bldg., San Francisco.

METAL SHINGLES
Meurer Bros., 630 Third St., San Francisco.
San Francisco Metal Stamping & Corrugating Co., 2269 Folsom St., San Francisco.

OIL BURNERS
American Heat & Power Co., Seventh and Cedar Sts., Oakland.
Fess System Co., 220 Natoma St., San Francisco.



Crude Oil Burners Operating Kitchen Ranges in Government Barracks at Fort Winfield Scott

OIL BURNERS
Modern EQUIPMENTS for Cooking and Heating Plants

S. T. JOHNSON CO.

1337 MISSION ST. SAN FRANCISCO — 945 GRACE AVE. OAKLAND

SPENCER ELEVATOR COMPANY
(FORMERLY WELLS AND SPENCER MACHINE CO.)
126-128 BEALE STREET
TELEPHONE KEARNY 664 SAN FRANCISCO

ARCHITECTS' SPECIFICATION INDEX—*Continued*

OIL BURNERS—Continued.
T. P. Jarvis Crude Oil Burner Co., 275 Connecticut St., San Francisco.
Compressed Air & General Machinery Co., 39 Stevenson St., San Francisco.
S. T. Johnson Co. (see adv. below).
ORNAMENTAL IRON AND BRONZE
Brode Iron Works, 31-37 Hawthorne St., San Francisco.
California Artistic Metal & Wire Co., 349 Seventh St., San Francisco.
J. G. Braun, Chicago and New York.
Ralston Iron Works, 20th and Indiana Sts., San Francisco.
Monarch Iron Works, 1165 Howard St., San Francisco.
C. J. Hillard Company, Inc., 19th and Minnesota Sts., Sain Francisco.
Shreiber & Sons Co., represented by Western Builders Supply Co., San Francisco.
West Coast Wire & Iron Works, 861-863 Howard St., San Francisco.
Vulcan Iron Works, San Francisco.
PAINTING AND DECORATING
D. Zelinsky, 564 Eddy St., San Francisco.
Horace W. Tyrell, 1707 38th Ave., Oakland.
Robert Swan, 1133 E. 12th St., Oakland.
PAINT FOR BRIDGES
Biturine Company of America, 24 California St., San Francisco.
PAINT FOR STEEL STRUCTURES
"Biturine," sold by Biturine Co. of America, 24 California St., San Francisco.
Carbonizing Coating, made by Goheen Mfg. Co., Canton, Ohio.
Joseph Dixon Crucible Co., Coast branch, 155 Second St., San Francisco.
Trus-Con Bar-Ox, Trussed Concrete Steel Co. (See Adv. for Coast agencies.)
Glidden's Acid Proof Coating, sold on Pacific Coast by Whittier, Coburn Company, San Francisco, and Tibbetts-Oldfield Co., Los Angeles.
PAINT FOR CEMENT
Jones-Duncan Company, successors to American Paint & Dry Color Co., 414 Ninth St., San Francisco.
Bay State Brick and Cement Coating, made by Wadsworth, Howland & Co. (Inc.). (See Adv. in this issue for Pacific Coast agents.)
"Biturine," sold by Biturine Co. of America, 24 California St., San Francisco.
Trus-Con Stone Tex., Trussed Concrete Steel Co. (See Adv. for Coast agencies.)
Liquid Stone Paint Co., Hearst Bldg., San Francisco, Los Angeles and San Diego.
Glidden's Liquid Cement, sold on Pacific Coast by Whittier, Coburn Company, San Francisco and Tibbetts-Oldfield Co., Los Angeles.
Concreto Cement Coating, manufactured by the Muralo company. (See color insert for Coast distributors.)
Moller & Schumann Co., Hilo Varnishes, 1022 Mission St., San Francisco.
Samuel Cabot Mfg. Co., Boston, Mass., agencies in San Francisco, Oakland, Los Angeles, Portland, Tacoma and Spokane.
PAINTS, OILS, ETC.
Concreto Cement Coating, manufactured by the Muralo company. (See color insert for Coast distributors.)
Bass-Heuter Paint Co., Mission, near Fourth St., San Francisco.
Whittier-Coburn Co., Howard and Beale Sts., San Francisco.
"Biturine," sold by Biturine Co. of America, 24 California St., San Francisco.
Heath & Milligan Mfg. Co., 9-15 Fremont St., San Francisco.
Glidden Varnish Co., Cleveland, Ohio, represented by Whittier-Coburn Co., San Francisco and Tibbetts-Oldfield Co., Los Angeles.
Goheen Mfg. Co., Canton, Ohio.
Moller & Schumann Co., 1022 Mission St., San Francisco.
Paraffine Paint Co., 38-40 First St., San Francisco.
W. P. Fuller & Co., all principal Coast cities.
R. N. Nason Co., San Francisco.
Standard Varnish Works, 113 Front St., San Francisco.
PAVING BRICK
California Brick Company, Phelan Bldg., San Francisco.
PHOTO ENGRAVING
California Photo Engraving Co., 121 Second St., San Francisco.
PHOTOGRAPHY
R. J. Waters Co., 717 Market St., San Francisco.
PIPE—CORRUGATED INGOT IRON
California Corrugated Culvert Co., Los Angeles and West Berkeley.
PIPE—VITRIFIED SALT GLAZED TERRA COTTA
Gladding, McBean & Co., Crocker Bldg., San Francisco.
Pacific Sewer Pipe Co., I. W. Hellman Bldg., Los Angeles.
Pratt Building Material Co., Hearst Bldg., San Francisco.
Steiger Terra Cotta and Pottery Works, Mills Bldg., San Francisco.
PLASTER CONTRACTORS
A. Knowles, 985 Folsom St., San Francisco.
PLUMBERS' MARBLE HARDWARE
Western Brass Mfg. Co., 217 Tehama St., S. F.
PLUMBING
Boseus Bros., 975 Howard St., San Francisco.
Scott Co., Inc., 243 Minna St., San Francisco.
Peterson-James Co., 710 Larkin St., San Francisco.
Wittman, Lyman & Co., 341 Minna St., San Francisco.
Alex Coleman, 706 Ellis St., San Francisco.
PLUMBING FIXTURES, MATERIALS, ETC.
Crane Co., Second and Brannan Sts., San Francisco.
N. O. Nelson Mfg. Co., 978 Howard St., San Francisco.
California Steam Plumbing Supply Co., 671 Fifth St., San Francisco.
Mark-Lally Co., First and Folsom Sts., San Francisco.
Western States Porcelain Co., San Pablo, Cal.

Specify **OPAQUE FLAT FINISH**
A High Class WASHABLE PAINT for Inside WALLS.
Less material required to cover more surface than any other similar Product.
R. N. NASON & CO. Oil and Paint Makers
151-161 Potrero Avenue — SAN FRANCISCO — 54-56 Pine Street

PORTLAND SAN FRANCISCO SEATTLE

Sound Construction and Engineering Co.

Incorporated

J. T. WALSH, Engr. and Mgr.

HEARST BUILDING, SAN FRANCISCO, CAL.

ARCHITECTS' SPECIFICATION INDEX—*Continued*

PLUMBING FIXTURES, MATERIALS, ETC.—Continued.
J. L. Mott Iron Works, D. H. Gulick, selling agent, 135 Kearny St., San Francisco.

POTTERY
Steiger Terra Cotta and Pottery Works, Mills Bldg., San Francisco.

PULLEYS, SHAFTING, GEARS, ETC.
Meese & Gottfried Co., San Francisco, Seattle, Portland and Los Angeles.

PUMPS
Chicago Pump Company, 612 Howard street, San Francisco.

REFRIGERATORS
McCray Refrigerators, sold by Nathan Dohrmann Co., Geary and Stockton Sts., San Francisco.
Vulcan Iron Works, San Francisco.

REVOLVING DOORS
American Revolving Door Co., 2514 Monroe St., Chicago, Ill.
Van Kennel Doors, sold by U. S. Metal Products Co., 525 Market St., San Francisco.

ROAD DRAINS
California Corrugated Culvert Co., West Berkeley, Cal.

ROLLING DOORS, SHUTTERS, PARTITIONS, ETC.
Pacific Building Materials Co., 523 Market St., San Francisco
C. F. Weber & Co., 365 Market St., San Francisco.
Union Blind and Ladder Company, manufacturers of the Acme rolling partitions for churches and schools, 3535 Peralta St., Oakland.
Wilson's Steef Rolling Doors, U. S. Metal Products Co., San Francisco and Los Angeles.

ROOFING AND ROOFING MATERIALS
Biturine Co. of America, 24 California St., San Francisco.
Grant Gravel Co., Flat Iron Bldg., San Francisco.
Fibrestone & Roofing Co., 971 Howard St., San Francisco.
"Ruberoid," manufactured by Paraffine Paint Co., San Francisco.
Mackenzie Roof Co., 425 15th St., Oakland.
United Materials Co., Crossley Bldg., San Francisco.

ROOFING TIN
American Sheet & Tin Plate Co., Pacific Coast representatives, U. S. Steel Products Co., San Francisco, Los Angeles, Portland and Seattle.

SAFES, VAULTS, BANK EQUIPMENT
M. G. West Co., 353 Market St., San Francisco.

SAFETY TREADS
American Mason Safety Tread. (See Adv. on page 147 for Coast agents.)
Universal Safety Tread Co., represented by Pacific Building Materials Co., 523 Market St., San Francisco.

SANDSTONE BRICK
Sacramento Sandstone Brick Co., Sacramento, Cal.

SANITARY DRINKING FOUNTAINS
N. O. Nelson Mfg. Co., 978 Howard St., San Francisco.
Haws' Sanitary Drinking Faucet Co., 1808 Harmon St., Berkeley.

SASH CORD
Regal Sash Cord, Louisville Selling Co. represented on Pacific Coast by Baker & Hamilton.
Samson Cordage Works, manufacturers of Solid Braided Cords and Cotton Twines, 88 Broad St., Boston, Mass.

SCENIC PAINTING—DROP CURTAINS, ETC.
The Edwin H. Flagg Scenic Co., 1638 Long Beach Ave., Los Angeles.

SCHOOL FURNITURE AND SUPPLIES
C. F. Weber & Co., 365 Market St., San Francisco; 512 S. Broadway, Los Angeles.

SCULPTORS
Western Sculptors, 533-535 Turk St., San Francisco.

SEWAGE EJECTORS
Chicago Pump Co., represented by Telephone Electric Equipment Co., 612 Howard street, San Francisco.

SHEATHING AND SOUND DEADENING
Samuel Cabot Mfg. Co., Boston, Mass., agencies in San Francisco, Oakland, Los Angeles, Portland, Tacoma and Spokane.

SHEET METAL WORK, SKYLIGHTS, ETC.
Berger Mfg. Co., 1120 Mission St., San Francisco.
U. S. Metal Products Co., 525 Market St., San Francisco.

SHINGLE STAINS
Cabot's Creosote Stains, sold by Waterhouse & Price, San Francisco, Los Angeles and Portland.

STEEL AND IRON—STRUCTURAL
Central Iron Works, 621 Florida St., San Francisco.
Dyer Bros., 17th and Kansas Sts., San Francisco.
Judson Manufacturing Co., 819 Folsom St., San Francisco.
Brode Iron Works, 31 Hawthorne St., San Francisco.
Mortenson Construction Co., 19th and Indiana Sts., San Francisco.
J. L. Mott Iron Works, D. H. Gulick, agents, 135 Kearny St., San Francisco.
Pacific Rolling Mills, 17th and Mississippi Sts., San Francisco.
Pacific Structural Iron Works, Structural Iron and Steel, Fire Escapes, etc. Phone Market 1374; Home, J. 3435, 370-84 Tenth St., San Francisco.
Ralston Iron Works, Twentieth and Indiana Sts., San Francisco.

CALIFORNIA ARTISTIC METAL & WIRE CO.
J. T. McCORMICK - President
ORNAMENTAL IRON & BRONZE WORK
349-365 SEVENTH ST. SAN FRANCISCO.
TELEPHONE: MARKET 2162

Turner Mushroom System

of Concrete Construction for Buildings and Bridges

The original reinforced concrete flat slab. No beams or girders.
Permits of a very rapid erection.
Effects a great saving in form cost and labor.
Vibration reduced to a minimum.
Makes possible accurate computation of deflection and strength.
Successfully used in more than 1000 important structures.
A system that assures economy and rapidity of construction together with durability and low maintenance.

C. A. P. TURNER
Phoenix Bldg., MINNEAPOLIS, MINN.

Pacific Coast Representatives
INDUSTRIAL ENGINEERING CO.
Clunie Building, San Francisco
E. T. FLAHERTY,
I. W. Hellman Building, Los Angeles
A. P. HUECKEL,
Vancouver Building, Vancouver, B. C.

ARCHITECTS' SPECIFICATION INDEX—*Continued*

STEEL AND IRON—STRUCTURAL—(Cont'd)
U. S. Steel Products Co., Rialto Bldg., San Francisco.
Schreiber & Sons Co., represented by Western Builders Supply Co., S. F.
Vulcan Iron Works, San Francisco.
Western Iron Works, 141 Beale St., San Francisco.
Woods & Huddart, 444 Market St., San Francisco.

STEEL PRESERVATIVES
Biturine Company of America, 24 California St., San Francisco.
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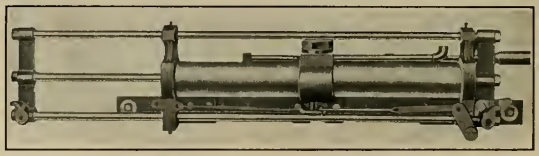

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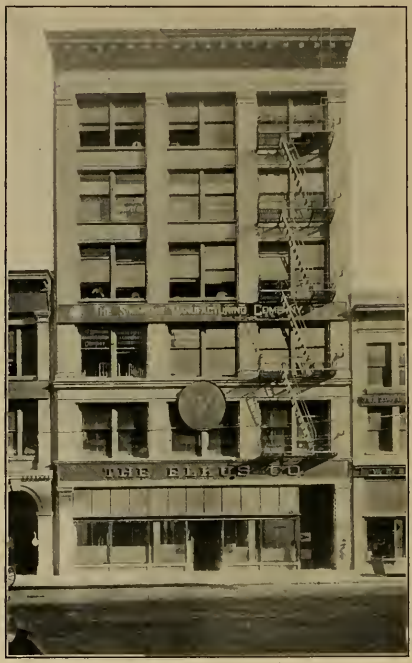

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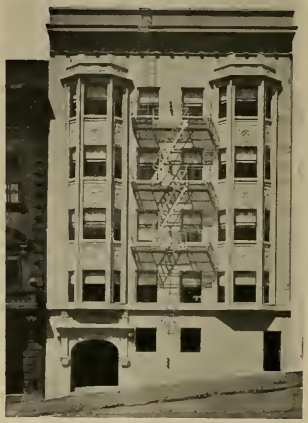

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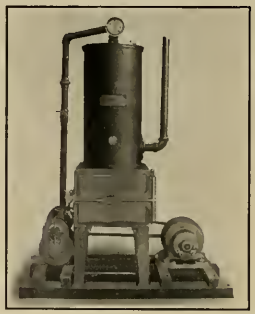

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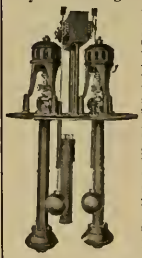

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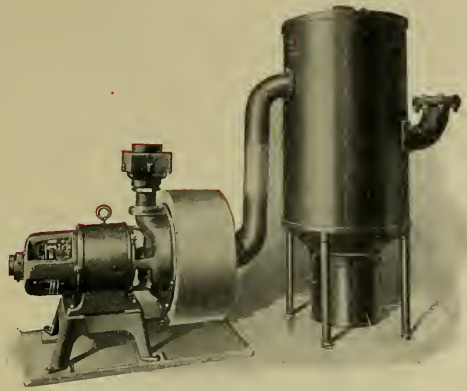

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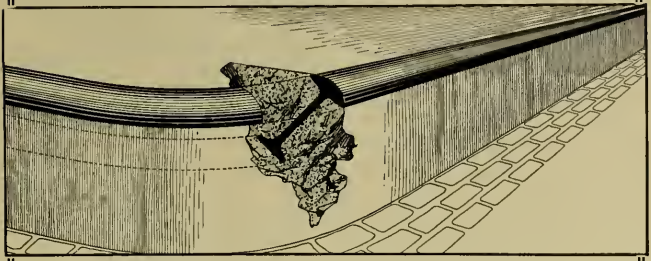

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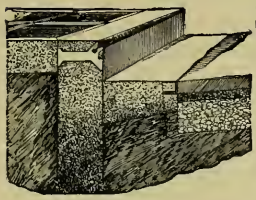

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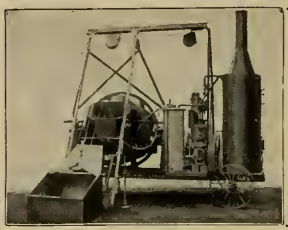

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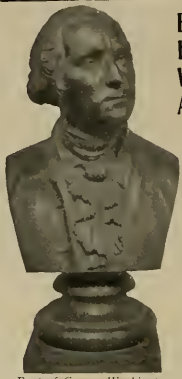

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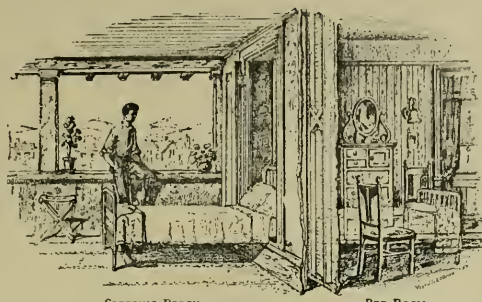

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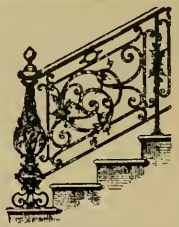

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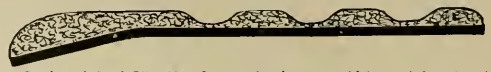

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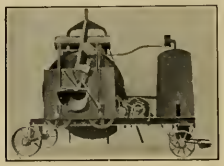

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ENTRANCE, SANTA ROSA HIGH SCHOOL
SANTA ROSA, CALIFORNIA
WILLIAM H. WEEKS, ARCHITECT

Frontispiece
The Architect and Engineer
of California
August, 1914

THE
Architect and Engineer
Of California
Pacific Coast States

VOL. XXXVIII. AUGUST, 1914. No. 1.

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School Architecture in California

Never before has school architecture received so much careful thought as the present day. School boards no longer rely upon the versatility or incompetency, as the case may be, of the carpenter-architect. Time was when an attractive perspective in water colors and a glib tongue of an enthusiastic designer were sufficient to win a commission. But things are done differently today. The school trustees study the situation closely, visit other schools for ideas and then select an architect whose reputation in school work is recognized. Some school boards conduct competitions, but this method is not popular, either with the authorities or the competitors, except in rare instances. In the succeeding pages will be found examples of California schools—all of them built within the last half dozen years—and they represent the best that money and talent can provide—fireproof, many of them, well ventilated, splendidly lighted, sanitary. The examples range from the modest open-air frame country school house to the pretentious, Class A 20-room and auditorium city building.

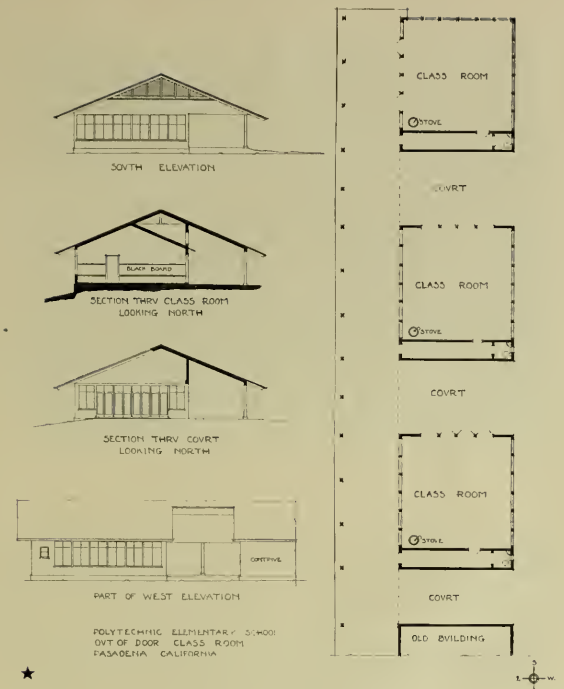
THERE has been a great deal written about school architecture—some of it by writers competent to give their views, but most of it supplied by educators who know little and care less, about design and building construction. Their ideas, like some of President Wilson's, are all right theoretically, but all wrong from a practical viewpoint.

In a recent number of the National Terra Cotta Society's Brochure, Mr. Fletcher B. Dresslar speaks of the Influence of Schoolhouse Architecture upon the Community, and goes on to say that this is the age of schools and schoolhouses, as characteristically as the latter part of the Middle Ages was the period of churches and great church buildings. In each case the faith and fervor of the people can be read and fairly understood through a critical study of these objective results and the ideals for which they stand. It will not miss the mark very far to say that the ideals and feelings which we associate with the notion of popular education, are becoming suffused with a glow and zeal heretofore only found associated directly or indirectly with religious faith and religious propaganda. And something of the same spirit that once wrought to build a tabernacle or a cathedral, worthy of a dwelling place of the Most High, is seeking expression in furnishing to the youth of our land nobler temples in which their hearts, minds, and bodies may better adjust themselves to the demands of a practical civic brotherhood.

The problem, then, of building a schoolhouse today is in no small sense complicated by the growing tendency to use schoolhouses for worthy social work of all kinds. This tendency operates to bring school work into more vital touch with the real life of the world; and *vice versa*, it is bringing the American community into a more vital relation with the teachers and those who are responsible for schools and school organization. Schoolhouses, especially in the large cities,

INTERIOR—PASADENA OPEN-AIR CLASS ROOM
Elmer Grey, Architect

INTERIOR—OPEN-AIR CLASS ROOM, PASADENA
Elmer Grey, Architect

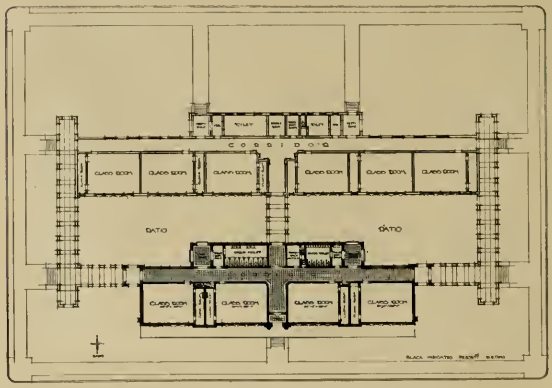


OPEN-AIR CLASS ROOMS, PASADENA
Elmer Grey, Architect

have come to be used night and day, summer and winter; vacation schools have been established, in which unusual programs of work and play have been introduced. For their successful consummation, such programs often demand equipment and accommodations not needed in the regular day schools. In planning even a country schoolhouse or village high school building, one must therefore think not only of the present requirements but also of the possible future needs of the community and enlarge his theories of the scope and purpose of public school education.

The planning, designing, and building of schoolhouses is a highly specialized business, and cannot be safely left in the hands of men who know nothing about it. The sane and economical thing to do, even if only a one-story school building is to be erected, is to engage the services of a capable and conscientious architect,

FRONT—GRANT AND JEFFERSON SCHOOL, SAN DIEGO
Theo. C. Kistner, Architect



PLAN—GRANT AND JEFFERSON SCHOOL, SAN DIEGO
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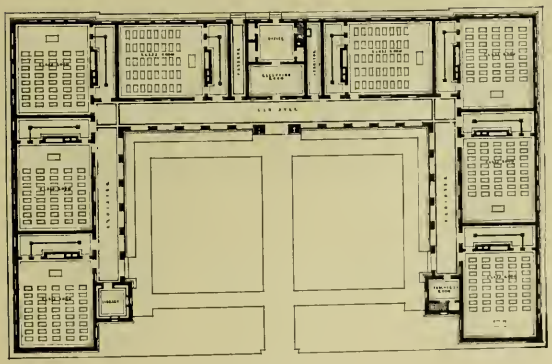

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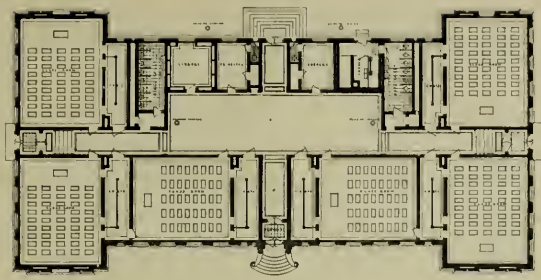

PLAN—ARTESIA GRAMMAR SCHOOL
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and with him work out every detail before the plan is finally accepted. Proportion in such buildings is almost everything, and to secure it, plans and elevations ought to be studied and carefully drawn, and specifications devised so explicitly that no mistake can be made. No amount of interior decoration will offset the bad effect of exterior ugliness. Real beauty is not expensive. The best things are in reach of us all. Log cabins can be built as satisfying to the artistic sense as palaces, indeed frequently more so. The planning of a one-story, one-room country schoolhouse ought to demand, and will demand from the scholarly, well trained, and efficient architect who is commissioned to design the building, as painstaking consideration as a large city school.

* * *

The plates which accompany this article are taken from an illustrated booklet recently published by the State of California, Department of Public Instruction. These cuts are of buildings which a special jury of architects, deemed the best examples of California school architecture. The jury was comprised of Lewis P. Hobart, Charles S. Kaiser and C. H. Cheney, architects of San Francisco; John W. Woollett, then state architect of Sacramento, and John J. Donovan of Oakland. Some four hundred photographs, drawings and blue-prints were exhibited and from this number the committee made a selection of about thirty-five. In this excellent attempt to raise the standard of school architecture in California, two things are to be regretted, which were not the fault of the jury, nor of Superintendent Hyatt. First, San Francisco and Los Angeles failed to respond to the invitation to submit photos and drawings to the jury, and second, the State Board of Control refused to permit the architect's name to be published under the reproduction of the building which he designed.

It must be admitted, therefore, that while the illustrations may represent the best of the work that was offered to the jury, there are probably many buildings that were not submitted for judgment, equal in excellence of design, to those reproduced herein.

The following excerpts from the report of the jury, prepared by Secretary Charles H. Cheney, will be found interesting:

When in 1909 the Superintendent of Public Instruction sent out a request to the city and county superintendents throughout California for examples of the best school architecture in their districts, there was a prompt and hearty response, productive of a very large number of school

WILD ROSE GRAMMAR SCHOOL, MONROVIA
Allison & Allison, Architects

building drawings and schemes. These were later published under the title of "School Architecture in California, 1909."

However, while there was a great demand for this pamphlet and the buildings embodied therein certainly did much to stimulate a further interest in school building, it was obvious that in getting out a new volume there might be a great opportunity to improve the standards and character of school architecture, if the architects of the State would co-operate in advising what were the best schools to be published and thus draw only good examples to the attention of boards of trustees, architects and school people generally.

An advisory committee of architects was therefore appointed from different parts of the State to act as a jury to pass on all designs and plans submitted to the superintendent.

The Basis of Judgment

During the school year of 1912-13 there was set aside and expended in this state for new buildings the sum of $7,372,215.18. This was distributed over kindergartens, elementary schools, high schools and normal schools. Hence, the importance to the state of obtaining not alone the highest practical results, but also the best designs and architecture.

If so many buildings at such great cost are set up annually as an object lesson to all the younger generation, is it not absolutely essential that they should advance the highest and noblest ideas possible, that they should form a nucleus for the patriotic sentiments of their respective communities? Should they not help to attract the incoming population which most of this state is anxious to have?

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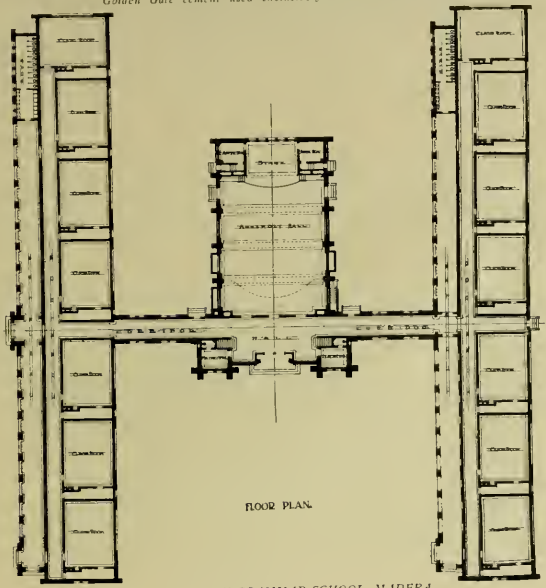
McDougall Bros., Architects
Golden Gate cement used exclusively on this building.



PLAN—LINCOLN GRAMMAR SCHOOL, MADERA
McDougall Bros., Architects

LINCOLN GRAMMAR SCHOOL MADERA
McDougall Bros., Architects

WILMINGTON HIGH SCHOOL
Allison & Allison, Architects

Place Good Buildings Where They Can Be Seen

The placing of fine schools or other public buildings to block the end of a street receives much attention in other countries. America is just beginning to take cognizance of this idea, owing to the checkerboard plan with which our cities are generally afflicted.

Good architecture is one of the strongest of favorable impressions that any municipality can make on its visitors, and if buildings can be so placed as to call attention to the fact that the taxpayers' money is well spent, the prestige and civic pride of the city can be greatly enhanced. The featuring of fine schools or other public buildings stopping the vistas of long streets forms a distinct relief to the monotony of the checkerboard street plan.

Good Architecture a Matter of Evolution

Is it right for local boards to work for anything but the highest results in buildings which are to determine the future efficiency and health of the generation? Should they not have at their command the best sources of information possible and be cognizant of the latest development in school architecture? Should public money be spent for anything but the finest buildings possible? Good results in architecture are largely a matter of evolution, of study, with a knowledge of the previous forward steps in design.

It is evident that if the foremost examples of each type of school building in these United States could be distributed to each member of every board of trustees in California, they could then go on improving and making over until we had built up a school of architecture founded upon the best that is in existence.

The School Site

The first problem, the size of the site, is a matter which is undergoing a tremendous change for the better in this state at the present time. The great value of organized play and the increasing interest in the opening of school buildings to the larger community for use after school hours, has led to the now generally adopted idea that every school should have ten or twelve acres of ground if possible. While the congested conditions in some cities make this impracticable in many cases, it is still significant to see municipalities as large as Los Angeles and Oakland purchasing such sites.

The orientation of placing of school buildings with relation to the points of the compass is an exceedingly important matter. A site where the general directions of enclosing streets are at an angle with the north and south is greatly preferable in that it admits the sunlight at some time of the day to most of the rooms of the building. The beneficent effect of sunshine as a germ destroyer cannot be denied and must be sought wherever possible. High ground, that is ground sloping off from the building site, is equally important from the sanitation standpoint.

Special Rooms Other Than Classrooms.

The determination of the special rooms required, other than classrooms, is a matter now provoking much important discussion. The assembly room with its moving picture apparatus and other fittings is being included in most of the new buildings in Oakland and Los Angeles, and it is generally considered by educators a necessary and very useful adjunct to every school building. Placed where it can be cut off from the rest of the building for use in the evening, it can be of great service to the community both for educational and entertainment purposes.

ENTRANCE—WILMINGTON HIGH SCHOOL
ALLISON & ALLISON, ARCHITECTS

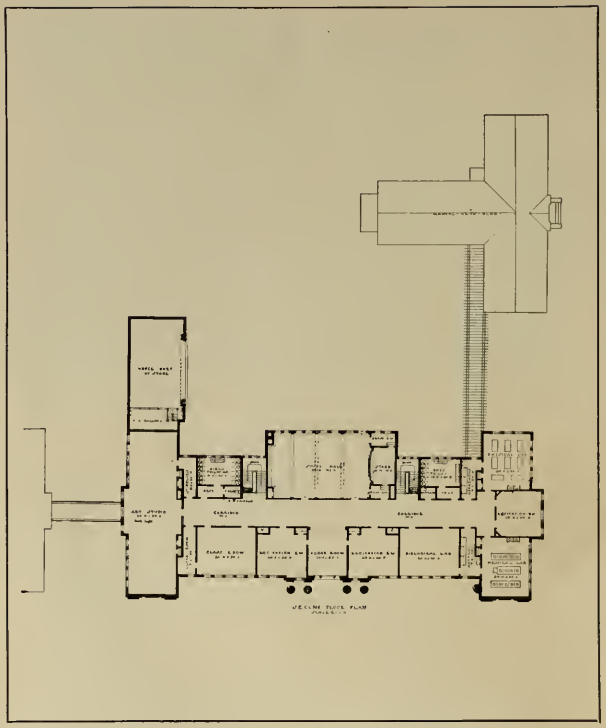
ENTRANCE—SANTA MONICA HIGH SCHOOL
ALLISON & ALLISON, ARCHITECTS

SANTA MONICA HIGH SCHOOL
Allison & Allison, Architects

OPEN-AIR AUDITORIUM, MONROVIA HIGH SCHOOL
Allison & Allison, Architects

MONROVIA HIGH SCHOOL
Allison & Allison, Architects

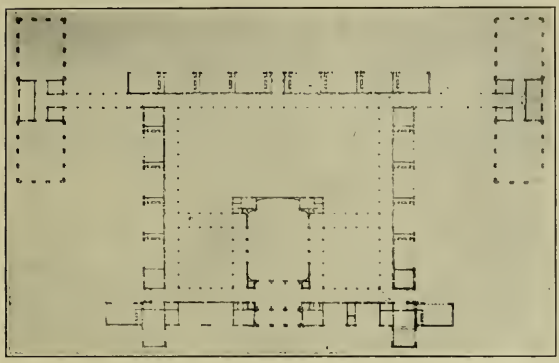
PLAN—MONROVIA HIGH SCHOOL
Allison & Allison, Architects



SECOND FLOOR PLAN OF MONROVIA POLYTECHNIC HIGH SCHOOL
Allison & Allison, Architects

A community club room to be used also as a branch public library or a possible voting booth, is another recent improvement widely accepted. Principals' and teachers' rooms and the arrangement of gymnasia for boys and girls, preferably in adjoining wings, form the basis for many neat adjustments in making a good plan. Toilets must be conveniently placed with respect to each group of classrooms and the classrooms arranged with corridors on the side opposite the lighting and in such a way as to make a short and convenient communication between the different parts.

ELEVATION OF LOCKWOOD SCHOOL, OAKLAND
Lewis P. Hobart, Architect



COMPLETE PLAN OF LOCKWOOD SCHOOL, OAKLAND
Reinforced Concrete Frame With Walls of Terra Cotta Blocks. Note the Open Cloister Effect. An example of the Unit Plan—10 Rooms to be Built at Present, on a 17-Acre Site
Lewis P. Hobart, Architect

The Buildings Selected For Publication.

The above outline of building requirements was briefly the basis upon which the architects of the jury acted in considering the buildings to be offered as examples of the best school architecture in the state. While there is no question that a splendid lot of buildings were selected, many of them fell short in one particular or other. However, the jury was much delighted at the sum total of really good buildings that have already been constructed in California and unanimously expressed the opinion that this state has a decidedly beautiful, practical and advanced trend in its school architecture.

In considering the different classes of buildings the jury was immediately impressed by the very small number of country schools of any kind submitted, although by actual count the district schools of the state greatly exceed all others in number.

Recommendations of the Jury

There is no use overlooking the fact that there is little effective guidance of school trustees and school people generally to secure the acceptance of

GRAND TOWER OF SAN JOSE STATE NORMAL SCHOOL
State Architect

good designs only. With this idea there was passed at the last session of the legislature a concurrent resolution appointing a committee of architects and hold-over senators and assemblymen to draft an effective and comprehensive law, providing for the establishment of a State Art Commission, to be reported to the next legislature in 1915 for action. Such a commission now exists in several eastern states and in the city of New York, where it has been a great success in raising the standard of public buildings generally.

It is proposed that a commission of architects and others versed in matters of art be established to act without pay, to pass upon all school buildings and as far as possible upon state, county and municipal buildings, with the sole purpose of preventing by veto power the erection of unsightly and poorly designed structures.

A State Art Commission to Pass on School Buildings

While somewhat of a new idea in California this certainly is the most effective method yet found to insure an expert check upon the designs of our school buildings. Undoubtedly such a commission could do a great deal of good and would meet with the wholesome respect of the community. If men of the highest type in other states agree to give a small part of their time each month, as they are now doing in New York and elsewhere, to the good of their commonwealth, there is reason to believe they will prove equally public spirited in California.

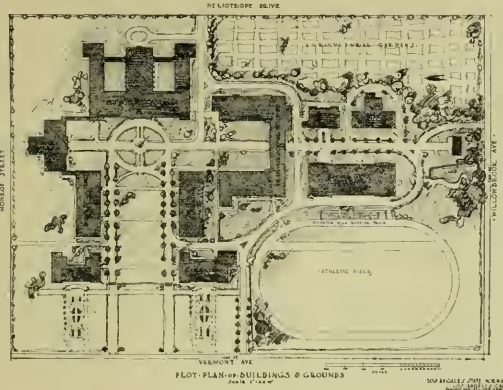
While some opposition will undoubtedly be met until the value of such a commission has been demonstrated, it must be remembered that this is not in any sense a new idea in America and that California is no longer a pioneer state. It now stands, particularly in its school system, as nearly the highest exponent of culture and learning in the United States. Our school buildings must needs live up to our school teaching standards and become typical of the greatest advance in school building and school architecture in America, instead of being sadly unsuccessful in design, as in so many cases.

MAIN COURT OF LOS ANGELES STATE NORMAL SCHOOL
Allison & Allison, Architects

There is every reason why California with its unusual climatic conditions should develop an architecture of as cultivated and distinguished a type as any old world country. Such a development must be a steady progress in design—the sifting and holding up to public notice of the best buildings, and the discouragement and elimination of poor ones.

It is sincerely to be hoped that the next legislature will provide for such a state art commission and that capable men be appointed to it with ample powers and tact to make its judgments secure a real advance in the standards of school architecture.

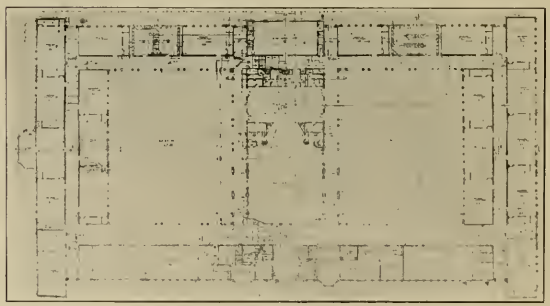
In closing, the jury unanimously expressed the conviction that such an inspection of the progress in school building as has been attempted herein, if repeated annually for the next decade, might be productive of a con-



PLOT-PLAN-OF-BUILDINGS & GROUNDS

BUILDINGS AND GROUNDS OF THE LOS ANGELES STATE NORMAL SCHOOL.
Twenty-two acres of land. Cost of Buildings $600,000
Allison & Allison, Architects

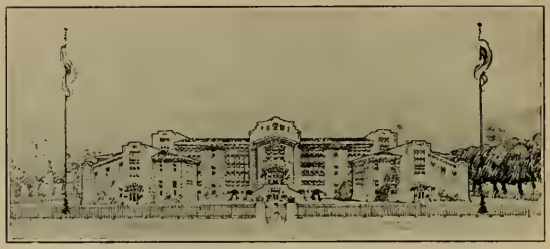
EMERSON SCHOOL, OAKLAND
John Galen Howard, Architect
J. J. Donovan, Supervising Architect
Golden Gate Cement used exclusively.



PLAN—EMERSON SCHOOL, OAKLAND
John Galen Howard, Architect
J. J. Donovan, Supervising Architect

PLAN—LAKEVIEW SCHOOL, OAKLAND
J. J. Donovan, Architect

COLLEGE AVENUE SCHOOL, OAKLAND
J. J. Donovan, Architect



DURANT SCHOOL, OAKLAND
Louis C. Mullgardt, Architect
J. J. Donovan, Supervising Architect

centration of thought in the state along the right lines, until California had indeed developed a demand for real architecture, and would not permit the perpetration of any thing else.

It may be well next year, and in the succeeding years, to select and publish, first, plans of the best new buildings of the year, and secondly, plans of the best of the old buildings which the progress of the year still holds worthy to be taken as examples, adding thereto such buildings as had been overlooked in previous reports and eliminating those displaced in standard by the new buildings. There would then be a sort of progressive competition leading to a definite indication of the progress made.

As soon as the community as a whole begins to know and distinguish, there is bound to be a sharp advance in both the demands of school trustees and in the knowledge and the character of design offered by architects themselves.

* * *

The report also contains a most interesting summary of the problems handled in the $2,000,000 worth of new school buildings in Oakland, by J. J. Donovan, supervising architect. In this connection illustrations of many of the buildings have been shown, some of which are reproduced herewith. There is also an appendix on Open Air Schools, prepared by the State Superintendent of Public Instruction, Edward Hyatt.

DEWEY SCHOOL, OAKLAND
J. J. Donovan, Architect

PRINCETON HIGH SCHOOL
Walter Parker & Co., Architects

The One-Story School House

THE Improvement Bulletin says: "It was reported recently that the Minneapolis Board of Education was considering the erection of a one-story school building. The statement was unusually interesting from the fact that several cities, notably Oakland, Cal., had tried out the idea. The news from the Minneapolis school board was one of many incidents which we had noted as indicating that 2-story or higher buildings for public schools were growing out of favor.

"It appears from inquiries, here and elsewhere, that the one-story structure has not gained in favor so much as to establish itself as decidedly the best to build under any or all circumstances. In fact the two-story plan still is the most popular for general use.

"Portable schools are one-story and, in Minneapolis at least, they have been a success. Many advantages are mentioned by a member of the board and he admits that being all on the ground floor is one of them. On the enthusiastic reports from the portable school was based, no doubt, the sudden popularity of the idea of building all schools in a similar manner. In this climate there are winter expenses to consider, as well as the ordinary outlays for construction. Heating a number of one-story structures would cost considerably more than the same room space in two-story buildings. First cost of buildings would be less. The two-story school undoubtedly will continue to be standard in Minneapolis.

"Climate conditions reasonably might be expected to favor one-story structures in California; and they do, according to our information. But still the authorities refuse to adopt that style for the future. John J. Donavan, supervising architect of the city of Oakland, says:

As a matter of fact it is an unsettled question as to whether such school buildings shall be one story or two stories.

While the one-story buildings have been a tremendous success in the way of accessibility to and from class rooms, at the same time my own experience leads me to believe that there is no set or fixed rule regarding the construction of school buildings, which unfortunately has been the case in the past. The vertical height of the school building should be determined entirely by the location, surroundings and vistas. In many places the two-story building is very superior to the one-story and as for economy, I believe it is somewhat cheaper.

An unfortunate feature connected with the school architecture in America seems to be that the designing and building of schools is parallel to measuring cloth with a yard stick, while it should be considered as a work for study, meditation and good architectural training.

GRAMMAR SCHOOL, MODESTO
Henry C. Smith, Architect

COMBINATION INDOOR AND OUTDOOR SCHOOL, SANTA CLARA COUNTY, CALIFORNIA
Wolfe & Wolfe, Architects

Present Day Tendencies in School Architecture

By NORMAND S. PATTON, Architect, Chicago, Ill.

SCHOOL buildings are planned through the co-operation of educators, architects and school boards. A knowledge of the tendencies of these three groups would enable one to forecast the school architecture of the near future with a fair degree of accuracy. If I were addressing the general public, I would describe those changes in our educational system that call for new types of buildings; but coming as an architect among educators, it is to learn rather than teach this branch of the subject.

Our educators must be the leaders in developing our system of education, and architects must adapt school buildings to the educational program.

In searching for the present tendencies of architects, there lies on the surface the fact that architects are coming under the influence of the educational system. The route to the architect's office lies no longer through the carpenter shop, but through the college and the technical school. Raising the standard of education among architects means better buildings of all classes, including schools.

The public school boards of today show a disposition to erect better buildings than formerly, and to provide more money for both building operations and for the services of the best architects. This liberality is due mainly to the general interest in all that promotes the welfare of children, and is an expression of the desire of the public.

This advance in the quality of school buildings is keeping step with the general advance in the architecture of all classes of buildings. It is a part of the higher scale of living and the demand of an educated and well-to-do public.

There is a marked tendency towards architectural display in high school buildings more than in the grade schools, due rather to local pride, than to any greater care for the older pupils. There is but one high school to many grade buildings, and it is natural to select this structure as one of the public monuments of the town.

The result of all these forces is that we are now in a time of active evolution and improvement in the construction and design of our schools. The public makes a liberal supply of funds; the best architects find it worth their while to study the school problem, and our monthly magazines find, in school architecture, interesting matter for illustration.

To come now from the general to the particular, what are the special improvements in the modern school buildings?

First, better construction, especially in resistance to fire and better provision for exits. City and state building laws aid this advance. Our larger cities require all schools to be of fireproof construction. The example of these buildings leads architects to approximate, at least, fireproof construction in other communities. The approximations consist in more numerous brick walls; making the stairs and corridors fireproof; the substitution of metal for wood lath; or the use of tile partitions; the making of the main floor fireproof, even though the upper floors and roof be combustible. The object to be sought in the construction of a school is to make a building in which the escape of the pupils cannot be cut off by fire or smoke. A fire in the roof space might ultimately spread downward and destroy the building, but there would be ample time for the pupils to escape before the fire or smoke could reach them; but a fire in the basement would travel upward rapidly and the smoke would fill the corridors. Hence the value of a fireproof floor above the basement.

Burlington Venetian Blinds used

HIGH SCHOOL GROUP, SAN JOSE, CALIFORNIA
F. S. ALLEN, ARCHITECT

If a school is reasonably well planned and built, there is little danger of actual contact with fire. The greatest danger is from panic and the resulting crushing on the stairways. The conspicuous avoidance of all combustible materials in the corridors and stairs will do much to allay groundless fear and thus avoid panic. If, from daily use of fireproof exits, both teachers and pupils gain the impression that their escape cannot be cut off by fire, they are not likely to lose self control in time of actual alarm.

Another improvement is in the line of better sanitation. The heating and ventilating system is a most vital part of a modern school. Steam heat is supplanting hot-air furnaces. Ventilation by natural draft can be made fairly efficient for grade schools of not more than eight rooms, but for larger buildings, and all high schools, mechanical ventilation is now considered a necessity. Automatic temperature regulation is no longer an experiment, but an essential part of a ventilating system for schools.

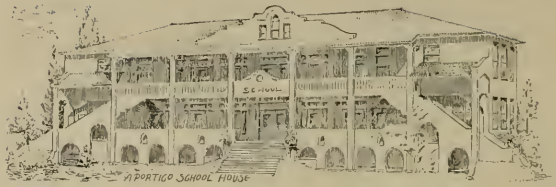
The limits of this paper will not permit a discussion of the details of heating and ventilation. Architects and engineers are in substantial agreement as to the methods to be employed. However, the experiment of open-air school rooms being tried in certain Chicago schools is worthy of serious consideration. It seems to be demonstrated that by introducing sufficient moisture into the air of the school room, the winter temperature can be reduced to sixty degrees, or even less, with a marked benefit to the health of the pupils.

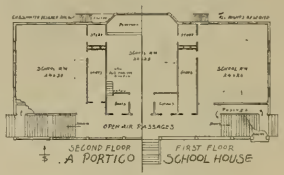
Since modern plumbing has become almost universal in the homes of the pupils, there is a tendency to make the fixtures in the school correspond to those with which the pupils are familiar at home; and to locate the toilet rooms on the various class-room floors in place of concentrating the same in the basement. In such sanitary reforms as the abolition of the public drinking cup, our schools are abreast of the times.

The ratio of window surface to the floor area is controlled by law in many states and there is little danger of insufficient windows in the school rooms of today. There is danger, however, of cutting off the light by an improper use of window shades. The object of shades in a school room is not to make the room dark, but to screen it from the direct rays of the sun. Therefore opaque shades should never be used. The best material is Holland cloth of a light buff color. The sun shining upon this material transmits a soft, mellow light. The darkest part of a room, of course, is the side remote from the window. The light for this side must come from the top of the window. Therefore window shades should never be hung at the top of a school room window. The best method of placing shades is to hang two shades to each window, both rollers being placed at the meeting rail of the sash, one shade to pull down and the other to pull up.

There have been great improvements in artificial lighting within the past few years. But, as school work is conducted mostly in the day time, the question of artificial lighting is not important, except in special cases.

The greater specialization of present methods of teaching and the addition of laboratory work in the schools, have led to the provision of special rooms. High schools, especially, have developed into complex structures. A well equipped high school will include an assembly hall, a library, and perhaps a museum, a gymnasium and laboratories for chemistry, physics and biology; shops for manual training; a kitchen for domestic science, with a model dining room; perhaps a room for sewing; a commercial room; drawing rooms for mechanical and free hand drawing; modeling rooms, with perhaps a kiln for burning pottery. One recent high school





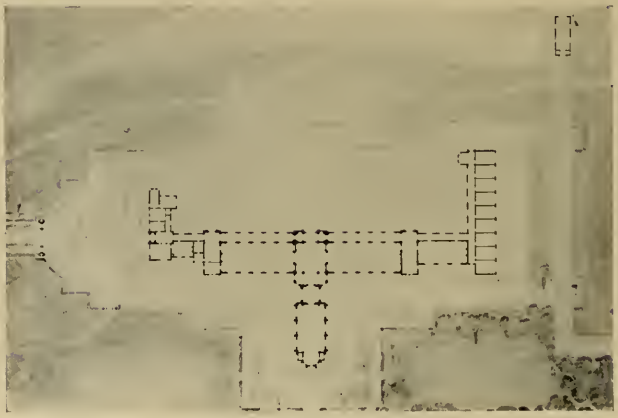
TWO-STORY OUTDOOR CORRIDORS—INTERESTING BUT QUESTIONABLE

SIDE VIEW OF OPEN-AIR SCHOOL, COLLEGE PARK, SANTA CLARA COUNTY

BOYS' POLYTECHNIC HIGH SCHOOL, RIVERSIDE
Norman F. Marsh, Architect

GRAMMAR SCHOOL, TURLOCK
Thos. B. Wiseman, Architect

GRAMMAR SCHOOL, OAKLAND
Stone & Smith, Architects



PLAN—BOYS' BOARDING SCHOOL
H. L. Shay, University of Pennsylvania

FRONT—BOYS' BOARDING SCHOOL
H. L. SHAY, DEL.

has an elementary science room, and special rooms for the study of the classic languages and English. The "Classic Room" designed and furnished in the Roman style, and the "English Room" in the English style, with a red quarry tile floor, brick fireplace, oak beamed ceiling and stained glass windows. A large sliding partition between the rooms permits uniting the two into a club room for the use of student societies. The intention of these rooms is to stimulate interest in these special studies by appropriate surroundings, and thus compete with the highly specialized science equipments.

Gymnasiums which were formerly placed only in large city high schools, are now becoming an essential part of every complete high school, and are being extended to the grade schools.

No one, who has observed school buildings of recent years, can have failed to notice an improvement in the character of the designs. This improvement is due partly to general advance in the quality of American architecture, but perhaps still more to the improvement in the quality of school boards, and their appreciation of good architecture. This leads to the selection of a higher grade of architects. Another tendency that makes for the improvement of school building, is the abandonment of the evil practice of having architects submit designs in competition. This practice has almost passed away, and architects are selected as a superintendent of schools would select his teachers, on the basis of their record in work already completed.

An examination of recent designs of school buildings, by many architects, and in all parts of the country, shows a tendency to greater individuality of design and a following of no particular architectural style. The best school design is that which follows no historical style of architecture, but is developed rationally from the conditions of the problem. For example, the large window area necessary in a classroom necessitates the use of very narrow piers between the windows. There is thus developed the idea of making the windows of each classroom into a group. If such window grouping is adopted, a style of design must be used that will lend itself to such treatment.

What is true of schools, holds good for all buildings. Every new type of building requires the development of a new style of architecture, or at least the modification of some old style. The breaking away from historic styles of architecture, and the evolution of new forms of design to meet new conditions in school buildings is one of the hopeful signs in present work.

The past ten years have seen rapid changes in building materials. Architectural design is affected not only by the purpose of the building, but by the material used. It is an axiom of architecture that no material should be used in imitation of another, but each material should be treated in accordance with its nature. Therefore the introduction of new materials, differing in nature from those formerly used, calls for new forms of design.

Exterior plastering in Portland cement has largely taken the place of wood as a covering for wood construction. Such a construction of wood frame, covered with plaster, is appropriate only for very small schools. At the present time, a construction is developing of hollow tile for walls, with a ribbed surface to receive plaster directly on the tile, both exterior and interior.

Exterior plastering has been introduced by architects as something better than wood siding or shingles, and, as a rule, this material has been handled in a truthful and artistic manner, in accordance with its nature. It is used as plaster, not in imitation of any other material.

In contrast to this, cement blocks have been invented as something cheaper than stone, and are usually made in imitation of stone. As an imitation, they are a fraud, and are not good art. Cement blocks can be made in a truth-

ful and artistic manner, but their large and uniform size makes them a poor material from the point of view of design.

Concrete, poured in place, can have a satisfactory treatment of the surface, but such treatment is expensive and this material is better adapted to constructive than decorative forms.

Of all new materials, vitrified brick seems the best adapted for general use in school building. This material has brought about such a complete revolution in our ideas of what brick should be, that I venture to expand somewhat in description of the new idea in brick. The old idea was mechanical perfection. The attention was concentrated on the individual brick rather than on the wall. We sought brick, with smooth surfaces, straight edges and uniform color. They were laid with fine joints. When the utmost perfection was attained in this direction, what did we have? A wall without force or character. The best brick wall seemed inferior to the meanest stone wall. We never escaped from the pettiness of the material. The soot of our cities stained the surface and the alkali came out of the wall whenever the water penetrated the porous brick.

Now we no longer think of bricks, but of brickwork. We seek a wall surface of varied colors, and a marked texture. We want a material that will appear as solid as stone and will be washed clean by every rain. We prefer large joints that bespeak strength rather than fine joints, whose noblest quality is neatness. We think of a wall of a building, as we look upon the walls of the Rocky Mountain canyons. The rocks were built up by nature, layer by layer, and the marks of stratification are apparent; but we do not dwell upon the smallness of the layers, but upon the massiveness of the rock. So with our wall of brick, it is built course by course. But when made of materials, vitrified by fire, and bound into one mass by cement, we lose sight of the individual bricks and see the wall which rivals stone in durability and massiveness and exceeds it in its capacity for color.

The latest improvement in the manufacture of brick is to roughen the surface of the stiff mud, as it comes from the machine, by cutting with wire, thus producing a variety of beautiful textures, according to the nature of the clay.

Vitrified brick is so different in character from the smooth and porous pressed brick that it is leading to the development of new styles of architectural treatment.

One of the most important movements in architectural circles has not as yet affected school buildings as it should.

I refer to the grouping of buildings and the treatment of the grounds as an integral part of architectural design. It is not often that public school buildings are built in groups, but even in the case of a single building, the location should be considered in reference to surrounding buildings, and all schools that have open grounds around them should have those grounds designed with as much care as is bestowed upon the building itself. Some architects have given study to this subject and can make designs for landscape accessories but in most cases it is better to employ a landscape architect, who should be selected by the architect of the building and work in consultation with him.

In conclusion, I offer a suggestion to any one contemplating building, that if you would get the best services from your architect, call him into consultation at the very beginning of your building enterprise, even before the site has been selected, or the bonds voted.

STAIRCASE, CITY HALL, OAKLAND, CALIFORNIA
PALMER, HORNBOSTEL & JONES, ARCHITECTS

Artificial Caen Stone in the Oakland City Hall

By GEORGE FREDERIC ASHLEY.*

ARTIFICIAL caen stone as used in the main vestibule, rotunda, council chamber and adjoining corridors of the Oakland City Hall is the result of the local development of a New York specification. The original intention of the architects was that the material should be imported, ready mixed, and applied by eastern workmen experienced in its use. Before proceeding on this basis, however, the contractor obtained permission to submit samples of his own manufacture, and the finished result of the experiments is an imitation stone quite equal, if not superior, to the product originally specified. New refinements in tooling and varying the shade of the stone make the work in the Oakland city hall probably the best example of artificial caen stone work on a large scale, ever executed. In consequence, the architectural profession of the Pacific coast is now richer in possibilities for the expression of their ideas without overburdening their clients financially.

The most successful foundation for the stone proved to be a scratch and brown coat of good hard-wall plaster. The brown coat should consist of equal parts of clean sand and well fibred hard-wall, and should be rodded or run accurately to within a quarter inch of the finished stone surface. The brown coat should be dry before applying the stone.

The artificial caen stone as used in the Oakland city hall consists of: 5 parts plastering Keene's cement; 5 parts Manti Utah stone; 3 parts "yellow" stone; 1 to 2 parts of a mixture of white and gray Portland cement.

The Manti stone and yellow stone are ground to pass a mesh 20 to the inch. The yellow stone might be described as yellow limestone, and is obtained in southern California. Its purpose is to counteract the whiteness of the Keene's cement. The Portland cement should not exceed three parts to thirteen parts of the other material, otherwise the finished stone is too hard to tool. The mixture of white and gray Portland cement was varied to produce three shades of finished stone, contrasting very slightly in tone. The materials were mixed dry in a machine to produce an absolutely uniform product.

In applying the stone the joints were first laid out accurately in chalk and about thirty per cent of the "stones" marked for varying shades, half of these being of the lightest shade and half of the medium. The darkest shade was used as the general or ground color. The realism of the final effect depends in a great measure on the combinations of the varying stones. These were determined by a careful study of existing buildings and plotted on a scale detail. After a few weeks' work, the journeyman who did the laying out was able to take care of the variations successfully without specific instructions.

In applying the quarter-inch finishing coat either the light or medium color went on first. The brown coat must be thoroughly wet down to eliminate any possibility of accumulated dust hurting the bond of the finished coat, which should be vigorously worked and floated. When the first shade in the section being finished was all on, the edges of the

* Mr. Ashley is Superintendent of Construction of the Oakland City Hall and is the personal representative of the architects, Messrs. Palmer, Hornbostel and Jones, of New York City. Owing to the signal success of the use of artificial caen stone in this building, and the many inquiries received regarding the composition and use of the material, Mr. Ashley was invited to contribute an article on the subject. The work was executed by Mr. A. Knowles of San Francisco.—Editor.

ENTRANCE TO COUNCIL-CHAMBER
CITY HALL, OAKLAND, CALIFORNIA
Palmer, Hornbostel & Jones, Architects

DETAIL OF CEILING, COUNCIL CHAMBER
CITY HALL, OAKLAND, CALIFORNIA
PALMER, HORNBOSTEL & JONES, ARCHITECTS

NORTH CORRIDOR, CITY HALL, OAKLAND, CALIFORNIA
PALMER, HORNBOSTEL & JONES, ARCHITECTS

ENTRANCE TO MAYOR'S SUITE
CITY HALL, OAKLAND, CALIFORNIA
Palmer, Hornbostel & Jones, . Architects

work were trimmed up and the second shade applied in the same way. This was followed by the ground color. Care must be taken to preserve marks to indicate the locations of joints for later reference. It was found most successful to work the men in pairs and to apply the work in sections no larger than could be finish coated in half a day.

When the work was bone dry the whole surface was "dragged" over with a coarse hack saw blade, or similar tool mounted on a handle. This tool removes the float skin and provides the ground effect of the stone work. The tooling should be done with long, vertical strokes, each stroke going from joint to joint of a "stone course". In general the coarser this tooling is the more interesting will be the final texture of the stone, also the more difficult will be the operation of tooling. After the stone was dragged, it was slightly sanded with No. 00 paper. This was followed by scraping a recessed "margin draught" seven-eighths of an inch on either side of the joints. The margin draft is a plain surface produced with a scraper, guided by a rod. It is sunk below the deepest tool marks of the saw blade. This was followed by cutting the joints, three-sixteenths inch wide, clear through the finish to the brown coat, with an imported caen stone jointing tool. The joints were pointed with a mortar which dried a light cement gray, contrasting with the varying shades of buff of the stone.

It is not practicable to vary the colors of a run moulding so that the medium shade of stone was chosen for this work. The play of light produced by the mouldings makes a variation of shade unnecessary. Ornamental work was cast exactly as cement plaster is cast, in painted glue moulds. The same composition of stone was used here as for plain work. After setting the ornament, it was lightly tooled and sanded to remove the casting skin and liven up the surface. Where the ornament was so intricate and fine as to make tooling impracticable, a wash of stone composition was brushed on. As casting tends to produce light shades, a dark mixture was used for this work.

It will be noted that no coloring matter was used other than the natural stones and cements. Effects are surest by following this method of controlling color. It is possible to use some colors in powdered form, but in using them there is always the danger of cloudiness on account of the irregular way in which powdered colors float up, producing the effect of plaster instead of stone.

The finished product, made as described above, with careful attention to all the details, will well repay the effort it takes. It is an absolute fact that contractors and stone masons used to dealing with caen stone and lime stone have taken the work in the Oakland city hall to be cut stone. In durability it is superior to Manti and similar soft building stones. In case of accidents to arrisses and sharp mouldings repairs are easily made and are invisible when finished.

Regardless of cost, in a country subject to earthquakes, artificial stone like this is preferable to quarry stone, even considering the ethics of art involved in the use of an imitation material. In regard to the cost of artificial caen stone, naturally, it will vary greatly in proportion to the percentages of stones differing from the ground color in shade, amount of ornament and run mouldings, proportion of curved surfaces, difficulty in laying out stereotomy, number of joints, etc. As a rough guide, an estimator would be justified in figuring work like that in the Oakland city hall at from thirty to fifty cents a square foot.

How Can an Architect Get New Business?

By CHARLES E. WHITE, in Building Progress

NO MATTER how well trained an architect may be; no matter how clever, how energetic or how efficient he is, he will not get very far without opportunities. A man's brains may teem with ideas. He may be saturated with knowledge which would be of utmost value to his clients but his skill avails him nothing if he has no chance to put it into practice—in other words if he has no "jobs."

An architect may begin his practice with suburban houses and end it with public buildings. His work might grow from a small beginning, rapidly evolving into something tremendous until finally it is nation-wide in scope, but every step in the link of evolution represents a "job." If the architect had lacked his first commission, or if his first commission had not brought him others his career would have been nipped in the bud and no amount of higher education, skill or general fitness for his profession could have brought him success.

"Success" of course, is capable of many different interpretations. Success as an artist is not contingent upon huge building operations. An architect can just as well show his mettle and prove his right to be termed "artist" by designing a $2000 cottage as he can by designing a public building. If a man is a true artist the artist touch can be discerned in his smaller as well as larger work. But the world has come to set a certain value on success which carries with it recognition for big things. Comparing two architects, he who has executed important work ranks (in the eyes of his fellow citizens, at any rate) higher than he whose practice has been confined to smaller buildings, and those but few.

And it isn't merely the architect's executed work that helps to make or unmake his reputation. The appearance of his office, the efficiency of his draftsmen, yes, even the looks of his desk have their effect. A slackly kept desk with papers disarranged helter-skelter makes an unfavorable impression upon business men, most of whom believe in order in all things.

A painter can win recognition by merely exhibiting his canvases upon the walls of a gallery. The poor, struggling architect, however, must actually build his designs before he can hope to win that place in his profession to which (he believes) education and skill entitle him. No matter how fine his drawings may be he will be judged by his executed work.

So to get right down to plain, every-day English, our young practitioner must have clients—he must get "jobs."

Now job getting is very repugnant to most architects, modest fellows many of them, entirely unfitted by education or inclination to go out after work in the same commercial way that a traveling salesman sells goods. Architecture is a profession. Doctors don't go out after business. Lawyers, we are told, consider it unethical to ask for jobs. Are Medical and Law professions requiring greater dignity in their disciples than Architecture?

To find the happy medium in trying to attract opportunities to oneself is quite a problem. Shall one sit quietly by and wait for opportunities to arrive or shall one energetically try to hasten and multiply them? This is the question—to wait or not to wait.

On all sides you will find successful architects whose business methods are diametrically opposed. Some wait for business and some don't. Some have received recognition and have been given more and more opportunities without having made any job-getting efforts. Others have been out in the cold world and have dragged their opportunities in.

Some young architects who were born with more than the average share of this world's goods keep draftsmen busy by entering competitions. Many an

architect has won his first chance in this way, capturing a cash prize or, better yet, securing the designing of some important public building, the execution of which brought him lasting fame. Most, however, cannot afford to maintain a crew of draftsmen for competition work. They require immediate earnings; their ideas must bring immediate returns. They must have real jobs.

Interviewed on the subject of job getting a short time ago an architect of world-wide reputation said to me, "I would like to tell young architects how proper I believe it to be for them to try every legitimate way possible to increase the number of their clients. Entirely aside from financial responsibility to himself and his family every architect has certain duties to perform. Therefore, he is in duty bound to increase (within the limits of good sense and refined taste, of course) the extent of his practice."

"What means do you consider in good taste?" I asked.

"Several years ago," replied the big fellow, "I adopted a custom of keeping track of every proposed building project that came to my attention. At first there were few of them that fell to my notice. Most buildings were commissioned and building operations actually started before I knew anything about them, but gradually, as my circle of friends increased, I found that I learned about many building improvements well in advance.

"This building information, call it 'building gossip' if you like (for of course much of it was inaccurate), I carefully noted in a little book which I carried in my pocket. Here it is," (and he exhibited a small leather covered pocket note book).

"Even to this day," he went on, "I note down every job I hear about. My partners carry similar books and we certainly consider this proper and in good taste.

"In the early days," he went on, "I personally investigated every bit of gossip that came to my ears. For instance, when I heard that Jones was talking about improving the corner of State and Washington streets I inquired until I found out all about Jones—who he was and where he lived. Then I sought out a mutual friend and got him to present me to Jones. It wasn't usually necessary for me to ask Jones for the job. Every business man knows when an architect is introduced to him that he (the architect) hopes to increase the number of his clients. But meeting Jones, well introduced by a substantial, mutual friend (for such I always endeavor to find) put me right in Jones' class. Then, usually, there were other meetings and frequently Jones, himself, with no prompting on the part of anyone, would talk his new building project over with me.

"Of course I couldn't always land the job," the architect went on. "More often, at first, I didn't, but my practice slowly increased. After a while it got so I usually made a hit. That's the way it usually works," he said, energetically, "the young man who is a live wire impresses everyone with whom he comes in contact. Work is actually thrust upon him. To get jobs it is only necessary for him to bump up against the right people—that's all—*bump up against the right people*," and he nodded his head vigorously.

The architect swung around in his chair and looked off over the city studded with skyscrapers, scores of which (in plain view from his window) had been designed by his firm. He went on, "When we hear of a new building project, now, some member of my firm keeps tabs on it. As soon as we learn that an architect has the commission, or if for some reason the project has been abandoned, we cross it off. Until the job has been settled one way or the other, however, we endeavor to keep track of it."

Many architects get after new work by means of letters. Friends, for instance, recommend such and such firm of architects to a prospective owner. Then the firm, having been tipped off, writes to the man who is about to build.

This may all be accomplished in a perfectly dignified way, but it is doubtful if letters are as satisfactory as a personal interview at which the architect can bring to bear his personality.

There is another factor in job getting, the importance of which will be vouched for by many successful architects, and that is what might be termed *making good*. No architect can succeed in building up a good practice unless he gives his clients good service. He may land jobs for a few years but eventually his practice is bound to dwindle down unless his reputation for efficiency is first class.

Along this line I asked an architect not long ago, "What made your practice grow?"

"I remember my first job very well," he replied. "For a year or two—ever since I left college—I had been employed as draughtsman in one of the old time offices. One day a friend of the family came to me and said, 'young man, I am going to build a flat building and you can have the job.' Of course I was very much elated. At first, I didn't throw up my situation but worked evenings on the plans for my new client. Never was a building more carefully designed than that one. Every inch of the plans I went over again and again until it was ready for contractors. At first I found supervision very difficult to accomplish without interfering with my position, so finally I figured that my fees would give me enough capital to live on for a few months and I resigned.

"Then," said he, "I found a little room over on C—— street which I think cost me $12 or $15 a month. There I drew all my details, spending several hours a day on the job and giving it the most vigorous supervision.

"When the job was done," went on the architect, "it was a splendidly built piece of work and the owner was delighted. He went around blowing my trumpet. Pretty soon another job came in (entirely through the efforts of my first client). This I handled efficiently and it brought another.

"The reason I have a big practice today, I believe," said he, "is because so far as I know I haven't a single dissatisfied client. No matter how unreasonable any client is I endeavor to please him. When the job is done I try to have him realize that he has the utmost worth of his money. During the progress of the job I literally run my legs off to save him unnecessary annoyance."

Careful supervision of work is of utmost importance to the owner. He is usually appreciative of the architect's efforts in this direction.

Said another architect, recently, discussing this point, "The most important thing, I think, is careful supervision. Owners don't know much about design but most every owner knows a good job when he sees it. He is bound to respect an architect who gets good work out of the contractors. There is nothing, I believe, that makes such a hit with an owner as *a first class, well built job,* and it is directly on account of our reputation for vigilant supervision of work that I think our practice has grown so large."

Volumes might be written about the qualities essential to win success. The very temperament of an architect may drive away clients. Some men you instinctively like. Others you dislike. One architect I know, so far as efficiency goes should have a larger practice, yet he barely scrapes along, rarely getting a job that is profitable. I think his trouble lies in his lack of *good feeling*. He frightens his clients to death by the lofty manner in which he goes through life. His dignity is so great that most people cannot get anywhere near him.

The relation between architect and client is a very personal one. There should be a bond of sympathy between them. If a client has certain ideas which he believes should be incorporated in the new building the architect ought to sympathetically consider the owner's wishes. Nothing leads more swiftly and

surely toward strained relations between architect and client than to have an architect "pooh-pooh" every suggestion made by the latter.

One of the greatest chances the architect has to make a hit is in the matter of cost of the building. Recently two architects at a down-town club were discussing this point.

Said one, "My practice has grown in the last three or four years so that it now embraces three separate branches—school houses, factories and office buildings. There is generally apt to be something doing in one or more of these lines the year round."

"That's mighty fine for you," said the younger man, enviously, "how did you build up such a fine practice?"

"Just by general efficiency," replied his older confrere. "My organization is built on efficiency lines. Some one in my office is skilled in every branch of the work. We have our own engineers, our own heating and plumbing experts, our own designers. The result is we work as a unit, make plans promptly and get excellent results on the job.

"Cost," continued the architect, "is where we usually make a hit. Take, for instance, the warehouse we are now building for the estate you and I were speaking of. Three years ago this estate had a certain architect design a building which cost to build 15 cents per cubic foot. There was considerable trouble during building operations—owner was annoyed and contractor had difficulty, owing to incomplete plans. When this new warehouse project came up the owner consulted me. I showed him where I could build a first class building for 13 cents per cubic foot—and I'm making good. We are actually building a better building at 13 cents than they formerly paid 15 cents for, in spite of the fact that prices are higher than they were three years ago.

"Can you guess who will probably get the balance of the work for that estate?" asked the architect, with a chuckle.

You have got to make good to succeeed. Business life seems to be all hustle and bustle with but little attention paid, apparently, to whither it tends. But there is a backbone and business acumen under the rush and worry. Business men are a keen lot. Competition is fierce for poor men struggling to keep above water. Attacks on rich men to get a slice of their money are intense. Nobody wants to spend money injudiciously. Everybody wants to get the utmost for the least cost.

The architect who wishes to succeed must imbibe the spirit of the age. He must maintain the open-door policy—open to all that pertains to his clients' interests. He must cut off all waste. He must pile on increased efficiency. He must reduce cost. He must increase quality, and all this in the face of a sharp yearly advance in cost of labor and materials.

If one architect is not able to do all this there will be others who are. He (the non-conformant) will be passed and outstripped by his fellows. *They* will get the big jobs and the bigger jobs. *Theirs* will be the growing business, his the declining. Good work brings more good work. Business efficiency brings more business. Satisfied clients bring more clients. Every successful architect has found this to be true.

* * *

The Usual Trouble

Visitor—"Are you having any trouble to find work for the unemployed here?"

Uncle Eben—"Nope. Our trouble here is to get work out of the unemployed."—Judge.

EDWARD D. SILENT BUILDING, LOS ANGELES
Hunt & Burns, Architects

Enameled Brick Popular for Facing Large Buildings

THE use of enameled brick for the exterior treatment of pretentious buildings has become so general in Southern California, that one would not be exaggerating conditions by stating that practically every third building of any size put up in Los Angeles the last two or three years has enamel brick in it. One of the first structures in the southern city to be faced with this material is the Central Building, illustrated herewith. Approximately one-quarter million cream transparent glazed brick are required for the two street facades and light court. The brick were manufactured by the Los Angeles Pressed Brick company and since this initial order the company has increased the capacity of its enameling department to 3,500,000 bricks annually, which is the best possible evidence of the increasing popularity of this material. Architects find the enamel brick a splendid veneer for concrete walls—clean, light and possessing a pleasing color tone. All of the accompanying illustrations are of buildings having enameled brick facing.

UTAH HOTEL, SALT LAKE CITY
Parkinson & Bergstrom, Architects

KING GEORGE HOTEL, OCEAN PARK, CALIFORNIA
Thornton Fitzhugh, Architect

WHITTIER SAVINGS BANK, WHITTIER, CALIFORNIA
T. Beverly Klem, Jr., & Co.

ELKS' TEMPLE, EUGENE, OREGON
E. E. McClaran, Architect

THEATER AND HOTEL BUILDING, OCEAN PARK, CALIFORNIA
F. T. Kegley, Architect

HODGDON BUILDING, HOQUIAM, WASHINGTON
Robert H. Burrows, Architect

VERMONT SQUARE BRANCH LIBRARY, LOS ANGELES
Hunt & Burns, Architects

STATE BANK BUILDING, SAN PEDRO
Edelman & Barnett, Architects

More Anent the California State Highways

By NATHANIEL ELLERY, C. E.

Third Paper.

FEW people of California realize what a road system for the state means. Each different locality strives to obtain a state highway through its immediate vicinity and when this has been accomplished, the advocates fall back to allow official matters to take the accustomed course. A general system serving the whole state is the desire, or should be the desire, of those in whose hands is entrusted this public duty. Extending that system beyond what can well and permanently be accomplished in construction is beyond doubt not good sound business.

California needs highways well constructed, highways adapted to the conditions obtaining in the different sections, but to cheapen the work for the sake of extending mileage is extremely questionable. Keep the roads away from politics, direct or indirect, and construct and maintain them along efficient business lines.

Let us investigate our present road status and look squarely at many of the questions involved. There was placed upon the statute books in 1913 a State Aid Road Law which grants aid to the counties. The assistance in this matter of state aided highways in construction cost apportioned two-thirds to the county and one-third to the state, and in maintenance cost, one-half each to the county and the state. The work is to be done under the supervision of the county surveyor and the state department of engineering. There were, however, no funds provided by the state to carry into effect this law and therefore it is inoperative at present. We note the $18,000,000 bond issue law is carrying the burden for state roads and we note that through the generosity of the several counties through which the state roads pass, the rights of way and the construction of bridges over twenty feet in length are provided by county funds.

This good will certainly augurs well for the co-operation of the road building divisions of the state and has allowed the state roads to be extended beyond the bond issue's intended mark. Now we see the remarkable extension of this co-operation in the purchase of state road bonds by the counties in order to allow them to participate in the conveniences of improved roads. **And these bonds bought and sold at a loss to the counties.**

Knowing the counties must pay the interest on the money invested within their bounds from the bond sale, it partially indicates to what extent interest in roads has been roused. This generosity with the counties' money has been a source of some wonder and much comment. Perhaps it is figured the generally enhanced values obtaining through the influence of such public improvement is worth the price.

Surely under these circumstances the expenditures should be made as effective in road results as possible. The organization of the highway department of the state seems too highly bureaucratic to be very effective. There is such a thing as overdoing the system, burdening the expenditures with red tape sufficiently to create inefficiency. Examine the following fact with me and draw your own conclusion.

It has been asserted by officials of the state that the overhead expense attached to the state highway work will be ten per cent, i. e., about $1,636,000. Over one and a half million dollars for engineering, inspection and administrative expenses for this project, when one million dollars should

suffice. An expenditure of this magnitude should be thoroughly engineered on a six per cent basis, for so much of the work is of marked similarity and much of the surveying along established road routes. This expensive political system established by the state does not indicate wise and economical road business. As a private engineer, familiar with state affairs, I am thoroughly convinced by experience that a firm of engineers could give as effective and good service as now obtaining in the state on a six per cent basis and make a splendid profit in the operation. The system of inspection now practised by the state seems highly ineffective and expensive. Apparently this service is fearful of consequences to the point of extreme timidity. Good, wholesome work is not accomplished under a plan of such subjection and creates a loss in proportion to the lack of courage to command respect.

So intimately tied together are all matters concerning the public road question one cannot deal with the different phases without regarding the whole subject. The actual construction of roads is only one dominant feature of the problem and to give the reader a clear conception many of the influencing points must be given without stint. State highway construction has now reached a point calling for the introduction of real maintenance and in this we will find our expenditures small or large in accordance with a proper location and construction.

Some time ago there was sent to the press of the state a written statement by the Highway Department of the state to the effect that the cracks in the concrete base were an economical feature calculated to save in construction cost by obviating the use of metal at made joints. This rather ingenious conclusion is designed for public consumption and not for those understanding concrete and concrete roads. That the facts may prevail, let me quote: "These cracks, according to the Highway engineer, are not only desirable, but they are economical as well. They take the place of metal expansion joints sometimes used in concrete highway building, and when the concrete is covered with the bituminous surface, the cracks serve a useful and necessary purpose but are not apparent to the traveler. The ability to do without metal expansion joints in California effects a large saving in construction which is put into additional mileage."

It is a fact metal protection is used for the edges of expansion joints in concrete wearing surface but not in concrete used as the base of a road. California state roads are supplied with concrete base and if a bitumen is used as a surface, then why this question of metal protected points? It is poor engineering not to provide for expansion or shrinkage joints in the concrete base when a thin cover of bitumen is used, and to allow the shrinkage cracks to occur promiscously in the base is inadvisable. These cracks certainly occur along the weak lines and therefore more readily break down with traffic. If plain joints are made in the concrete base and then a bituminized surface is placed upon it, also filling the joints, there is absolutely no need for metal protection. How about the lack of proper joints in the concrete roads near Turlock which recently expanded and buckled or bulged up, causing a breaking up of the concrete and necessary mending? Had proper joints been used this would not have occurred.

While we are dealing with this matter allow me to draw your attention to some more pertinent points that may assist to throw light on our highway situation. In my former article I showed a view of the state highway near Healdsburg that was torn up for about 700 feet. The photograph was taken March 1, 1914. On February 28, 1914, or the day prior there was issued and published a statement by the state calling the attention of the

residents of that section to the fact the road had been torn up on account of defective work and had been replaced. See the photograph of the following day showing the road torn up but not replaced.

In connection with the location and grading of the state roads there were many places not raised high enough to properly drain the soil. Even in places such as the section north of Turlock where earth is filled about two feet thick over the concrete to avoid a water hole, a point south of Healdsburg where the winter waters covered the road in a sag and at Rock Creek, south of Lincoln, water covered the road base of concrete during a time in the winter. Again, the oiled macadam road south of Marysville is not sufficiently graded up to keep the base ordinarily dry in winter. A fairly dry road base during the wet season is essential for good road construction and a minimum maintenance. This fact should have received special attention as it is of paramount importance to the life of the road. We all know how necessary it is to drain our ordinary unimproved roads if we are to use them in winter with any degree of satisfaction. Many thousands of dollars have been spent in California temporarily turning the surface water from the roads and in the mountainous districts it is of the utmost necessity to divert the water from the road bed. We will have earth roads in many places of the state for a long time to come and they should be treated in a manner to give the best service. Plenty culverts should carry water across the line of road and on flat ground the road should be well graded up while on hill or mountain side it should be well ditched with water runs not too long before diversion under the road. The temporary makeshifts of hummocks directly or diagonally across the road for water diversion are antiquated but when used should certainly be torn out at the beginning of travel in the spring of the year. There seems to prevail the notion that we must endeavor to get all our roads improved by the latest fad or fancy but from years of study and experience this idea is seen to be erroneous.

Have not you traveled some splendid gravel roads—roadways crowned, smooth and hard, standing the strain of heavy traffic? Good judgment and sense in the application of gravel to many of our secondary roads will give excellent results. Where they are sprinkled, slight indents in the surface retain the water and the wheels and hoofs of travel deepen this softened spot. This fact is easily ascertainable upon a little investigation and may be remedied by careful attention. Many of the creeks of California furnish a cheap road material for an extensive mileage of roads of secondary importance.

The use of oils for roads has practically received its death knell in our state because of neglect, inattention and lack of knowledge of the material. A few years ago anybody could oil a road, but I saw but very few who knew the first rudiments of the subject. Largely on account of no systematic experimentation and the lack of thorough knowledge, failure upon failure occurred until today we see but the remnants of oiled roads both in place and alongside the present traveled way. The heavy asphaltic oils, material of splendid road value, are now being used principally for a bituminous road cover. It is now a general knowledge that we require some sort of bituminous or tough material for resiliency and resistant to shocks caused by the travel.

The expense of construction should be carefully weighed in order to make the upkeep cost as reasonable as we can. If we build concrete base roads too narrow or too thin how can we at a future date widen or thicken them with reasonable cost? It cannot be done. If you will look at the many efforts to patch the concrete in the various structures where it is

used, certainly the lack of joining will immediately tell the tale. On the state road, near Lincoln, several points were washed out under the concrete and were replaced. At a future time these will show in a lack of proper performance of its work. Upon examination of the state roads I came upon one feature worth discussion and one easily remedied.

The state highway paralleled the railroad and was perhaps sixty or seventy feet from it. Where a culvert was installed in the railroad fill the state placed one opposite in the highway. The waters flowing through the culvert under the railroad struck the head of the highway culvert with much force and partially washed the fill away causing considerable damage. Had the engineers provided an even section of paved ditch from the exit of the one culvert to the intake of the other this trouble would have been avoided.

On the shoulders of the road much trouble will be encountered in the endeavor to make the two different materials stand the traffic together. The concrete base is rigid and the adjoining shoulder is of vastly different density. Where the sands of the San Joaquin Valley are traversed this difficulty will be greatly enhanced. Surely it would have been the part of wisdom to have increased the width of the concrete base here to twenty or twenty-two feet and avoided much of this expensive shoulder work. Again, where the concrete base terminates in sharp edges, as it has in the state work, it will certainly spall away. Here particularly should be a rounded and heavy edge. Wherever the travel has been at all extensive the surface of the concrete not yet bituminized has shown the decided effect of wear.

There is one remarkable example of wheel tracking to be seen on the concrete pavement in the San Joaquin Valley state road. Upon examination the evidence of wear was distinct and defined in this case. Certainly it is essential that the traffic be distributed over the entire surface or nearly as practicable in order to create a more even wearing. This is a vital point where horse drawn vehicles are much used. Go on those roads where heavy teaming with horses has been the practice and the wheel ruts practically constitute the mountain road while in the level districts they follow a distinct line of wheel tracking. Surely the road would last much longer had this wheel cutting and grinding been distributed more evenly. The bituminized surface used as a top by the state demands the traffic be not confined to narrow limits.

As yet, the matter of brick pavement has received little attention in California, most likely for the reason of our great production of asphalt and asphaltic oil and also the higher cost of such work. Paving brick, however, make a splendid wearing surface when properly made and laid. The bricks should be of a very tough, hard nature that they can resist wear and shock. In laying them the greatest care should be exercised in order to have a smooth unwavy surface. A good concrete base, a sand cushion and grouted cement joints will give excellent results and give a pavement fully capable of resisting present day traffic.

In hot climates, where the summer heat softens the asphalt pavement, brick is far superior for traction as no softening occurs and consequently there is no wavy action of the surface.

It is not so easily cleaned as asphalt surfaces, but is cheaper in repair and maintenance. In some of the middle western states brick has played an important part in road and street pavements giving remarkable satisfaction. In our state brick pavements should be given a trial in competition

with other materials for we shall soon be demanding a high-class maintenance on our state roads and definite information on a section of state road subjected to the more severe traffic would be extremely valuable.

In the last and succeeding article the subject matter will deal principally with the maintenance of our county and state roads.

* * *

The Modern Architect

THE Engineering Record, in a recent issue, discussing the complex duties of the practice of architecture today, states editorially: "Before passing hasty judgment upon the architect of our own times, think a moment of the evil days upon which he has fallen. In the medieval times he must perforce know only the technique of masonry—the rest was his art. If he were building a church the fine stimulus of the Gothic was his inspiration and his medium was craftsmanship in stone. Today he must know masonry and concrete, structural steel and sanitary plumbing, lighting and heating, electric wiring and acoustics.

"His predecessor did not have to plan for buying his stone from one source; his steel from another and his woodwork from a third; he was not hounded by agents of patented devices nor pestered by circulars of supplies offering him 'the usual architect's commission of —— per cent.' All these things the architect of today has to endure, besides being called a slavish copyist if he turns to the best in antiquity and a commonplace innovator if he does not.

"His chief hope is in suiting himself as best he may to new conditions, calling in technical advisers on the details which he cannot in the nature of things have time to master, even if he has the ability, standing the more firmly by the interests of his client as he comforts a regiment of sub-contractors, and remembering that he must be artist before being engineer or contractor. Originality and resourcefulness are much more difficult to find than technical or constructional skill, and if the architect is to be more than a master mason or boss concrete mixer it must be by the possession of these attributes. Art did not die with the Gothic nor perish with the Romanesque. The times have changed and the architect must change with them.

* * *

Steel Frame Hangars

Structural steel frames of very considerable size and complication of design are being used in Europe as hangars for large dirigible balloons. In general, these sheds consist of a series of simple arch frames, similar in design to the usual armory roof in this country but of much lighter material because of the very light roofing. They are usually rectangular in plan, providing room for one airship with exit or entrance at either end, but some of the newer sheds are wide enough for two airships, side by side, and proposals have been made to build them in triangular or in starshape plan, so as to provide entrance in the direction best favored by the prevailing wind. To accomplish this latter end, at least one shed has been built, 443 x 85 feet in plan, mounted on a turntable so that it may be turned to meet any wind condition.

BANQUET IN HONOR OF CASS GILBERT AND PAUL P. CRET GIVEN BY SAN FRANCISCO CHAPTER, A. I. A.

BRONZE SIGN POST
JOHN REID, JR., ARCHITECT

BALCONY RAIL, MALCOLM APARTMENTS, SAN FRANCISCO
Dunn & Kearns, Architects

The Steel and Iron Industry of the Pacific Coast

VI. THE C. J. HILLARD CO., INC.

THE manufacture of metals into what we term "ornamental iron" is a most interesting process. An architect's embellishment of his building is not confined to any one material, but there is probably no one type of ornamentation that contributes more to an attractive exterior than cast iron and metal work. Wood, plaster, clay products, cement and stone all have their place, but they do not give the substantial, showy effect that is possible with ornamental iron. The very stubbornness of metal composition tends to reward the metal worker for his art and persistence. A piece of finely wrought metal work, cleverly designed and artistically proportioned is a lasting and permanent tribute to man's industry and ingenuity. The workman of earlier days left many fine examples of hand-wrought metal work, but what changes the precision and accuracy of modern machinery have brought about! What once took a workman weeks and months to execute is now done in a few hours with the aid of modern devices.

The Western coast is very fortunate in the establishments devoted to the working of metals, both structural and ornamental. Some of these are in their present condition of prosperity by reason of slow growth over long periods of years. The shops of the C. J. Hillard Co., Inc., were only started a few years ago; to be exact, in June, 1910, and the purpose of Mr. Hillard was both deliberate and intentional; to establish a plant on this coast to produce scientifically and economically metal products for ornamental architectural purposes.

WROUGHT IRON ENTRANCE
JOHN REID, JR., ARCHITECT

CAST IRON ENTRANCE AND MARQUISE TO HOTEL GLENN, SAN FRANCISCO WILLIAM H. WEEKS, ARCHITECT

ELEVATOR FRONT AND BRONZE STAIRWAY, RIALTO BUILDING, SAN FRANCISCO
Bliss & Faville, Architects

The company has an ideal site in what might be called San Francisco's "steel belt," at Nineteenth and Minnesota streets, near to transportation both by water and rail, upon which is built a roomy, well lighted factory and office building with more than twenty thousand square feet of floor space, equipped with modern machinery, carefully selected and properly located for rapid and economical production.

That Mr. Hillard's efforts are not confined locally to San Francisco is well noted by what follows,—really, the success of any institution is what they have done and what they are doing.

The Hillard shops are getting out and installing ornamental iron work now in the Los Angeles State Armory, some twenty thousand dollars worth; the Franklin School at Bakersfield; the Gottschalk building and Odd Fellows hall at Fresno; the Phoenix Mills at Sacramento; the Grand Theatre at Winnemucca, Nev.; the Eureka High School at Eureka, and in San Francisco: the Academy of Sciences at Golden Gate Park; the Wilson and Martin apartments at Powell and California streets; the Lachman Brothers building at Sixteenth and Mission streets, and the apartments on Pacific avenue, this latter building being elaborately trimmed with ornamental iron, both interior and exterior. Some beautiful examples of the French Renaissance are to be executed in gates, grilles, and balcony fronts, together with stair wells and rails.

The annual volume of business is over one hundred and fifty thousand dollars, and constantly increasing. Business depression, so-called, Mr. Hillard does not seem to recognize or even acknowledge in the industry of his establishment.

In reviewing some of the creditable work of the past few years the following contracts should be mentioned,—the Reno, Nevada, Courthouse; the Rialto building; the Native Sons' hall; the Glenn hotel; the Hihn Estate building; the Druids' hall; the Red Cross Hospital at San Mateo; the Rowell building at Fresno, and many others.

Mr. Hillard has had work intrusted to his shops by a large and constantly increasing group of well-known architects, among whom might be mentioned.—Bliss & Faville, Lewis P. Hobart, W. H. Weeks, C. A. Meussdorffer, Righetti & Headman, E. P. Antonovich, Dunn & Kearns, Fabre & Bearwald, F. J. DeLongchamps, Orville C. Clark, P. J. Herold, and others.

No attempt has been made to specialize in any one line of ornamental iron work, but much success has been achieved in the manufacture of metal stairways entirely of steel without any cast iron features.

Some typical work of the C. J. Hillard Co., Inc., is shown in the accompanying illustrations.

*
* *

Troubles of the Contractor

WORD comes from St. Paul, says the Improvement Bulletin, that a contractor there may lose $1,000 because he thought a zero was a dot. He bid on some sewer work and read "660" feet, 66 feet. A clerk in the engineer's office, it is said, makes a funny cypher—very peculiar, no doubt, in the opinion of the contractor who may have to pay $1,000 for discovering the peculiar habit. It seems fair that the city should cause its employe in this instance, to use a different—the regulation—model for his zeros, and give the contractor another chance.

* * *

Another unfortunate contractor was hurrying to a place of letting with his bid when his automobile broke down. Before he could get it fixed, or reach the place otherwise, it was too late. Naturally he found that his bid would have been low. We have noted a commendable fair-play spirit among officials lately in accommodating bidders who are unavoidably detained, or victimized by their own pardonable mistakes.

* * *

A contractor who had carefully estimated a job placed the bid in his pocket and started on his way to submit it. He loitered too long and filed about twenty minutes too late. It was discovered that he was low; but his bid was rejected on account of his failure to watch the clock. Most business men will agree that this gentleman of leisure got a square deal.

* * *

In another instance, an Iowa contractor was low but he had not itemized as required and the council did not accept his bid. In this case the treatment was not only fair but liberal. The council decided to advertise again. Three times the council has attempted to dispose of this question. The first time it was found there was a technical error in the proceedings, sufficient notice not having been given. The next attempt found the bids too high and the third resulted in postponement because the lowest bidder did not itemize his estimates. Here is a big, broad spirit that would give everybody a chance.

Something About Terrazzo Floors*

By CHARLES R. MARSH.

TERRAZZO is defined by Russell Sturgis, in his "Dictionary of Architecture and Building" as:—"An expensive concrete pavement used for floors in the province of Venetia, even in houses of some pretensions to elegance. Lime mortar made unusually dry is the principal material; in it are inlaid small pieces of marble, usually not too large to pass through a ring an inch and a half in diameter. The whole is beaten hard, rubbed down and polished. Fine examples are given, full size, in Gruner's "Specimens of Oriental Art."

I have been unable to find anything further than the above, regarding the subject. Because of the very limited literature pertaining to terrazzo, and because of the great difference in the appearance of it and the varying ideas held as to how such work should be done, the writer was prompted, in March, 1912, to address the members of the society regarding certain vital details of this subject. The generous response to that postal card inquiry contained many, varying and conflicting opinions. This shows that the subject was an interesting one to most of us. This, in turn, prompted me to go further into the subject, and as a result individual letters were addressed to about ten contractors for terrazzo work; to about fifteen firms of architects and to five professors of architecture in the leading universities having courses in architecture.

The replies from professors of architecture were disappointing as they contained absolutely nothing of value to a better understanding of the subject.

By ascertaining the ideas and opinions of the best architects and contractors for any class of work and supplementing that data by the opinions of superintendents who have seen and noted the results obtained by various methods and designs, we can decide on what is best both from a structural and an economic standpoint.

Superintendents for the most part seem to be biased in their opinions in favor of the methods specified for the work they have in hand and have apparently given little thought as to how methods or design may be improved.

Superintendents all agree that it is necessary to have the floor slab well cleaned and washed before the base for the terrazzo is placed. Mention is made by very few to one of the most important items, that is, the aggregate. One supervising superintendent states: "Never use cinders, as good cinders are hard to get and expansion in most cinders causes the work to lift. Use stone, gravel, terra cotta and brick provided they are free from coal, lime or magnesia." Contrast this with the varying opinion of a superintendent who states: "I think the best way to lay terrazzo on a fireproof floor is to use a fill, where necessary, of cinder concrete."

The Venetian Tile & Marble Co. of Detroit, write: "We do not think it really necessary to lay the finish coat of terrazzo before the base has set, but the base should not be left for more than twenty-four hours. "A second Boston firm thinks that it is best to lay the finish the day after the base is placed, and a third Boston contractor is of the opinion that it is best to lay the finish after the base has set, but not more than twelve hours later.

All contractors agree that it is best to mix the chips and cement dry and then add the water. The Fishbach Co., state that they do not approve

* Extracts from a paper read before the Society of Contractors of Federal Buildings

of the old and inefficient method of spreading a sand coat, and on this sprinkling marble and rolling it. When the proportions of chips to cement are mentioned it is usually one cement to two and one-half chips; one contractor thinks that it is best not to specify the proportions of cement, but that enough be added to fill the interstices. This latter method is the requirement in late office specifications. None of the contractors state the exact method of applying the marble chips.

Architects in writing specifications for terrazzo vary in the length and minuteness, but on the whole they require stricter methods than contractors propose.

McKim, Mead & White specify that the wearing surface shall be placed before the base has set, and that only enough cement be added to the chips to "firmly unite the pieces."

Peabody & Stearns in their specifications for the new Boston custom house call for terrazzo one inch thick, and "to be rolled and then to have more chips strewn over the surface and rolled again."

F. M. Andrews requires in the specifications for the new Hotel McAlpine, New York, that there shall be a cinder concrete base, and that the terrazzo shall be placed two days after the laying of the same, or to quote fully from the specifications:

"The top finish shall be laid within two days of the placing of the base, preferably as closely following as possible. A thin film of 1:2 mortar is to be drawn over the cinder concrete base in advance of the main bulk, and this is to be thoroughly troweled into the base and then brought to within one-half inch of the top of the borders. Level this and while still soft cover the same with a bed of clear Portland cement paste and marble chips, in equal quantities by bulk. Note that all terrazzo is to seven-eighths inch to one inch thick. The marble chips shall be of such size as will pass through a three-eighths inch mesh. Such of the chips as will not pass through a five-eighths inch mesh are to be used for sprinkling on top of mixture of cement paste and marble chips after same has been leveled, and are to be rolled in."

The specifications for the new Field Museum at Chicago, written in the office of D. H. Burnham & Co. in part as follows:

"Filling under terrazzo shall be composed of one cement, two sand, and four brick. Before concrete filling commences to set spread a three-fourths inch wearing surface composed of marble chips with only enough neat Portland cement to firmly unite the pieces. Trowel and roll, and after the mortar has set, the terrazzo to a smooth, even surface and wash clean.

For all marble tile and terrazzo floors concrete bedding will be brought to within two inches of the finished floor surface by the masonry contractor, the marble contractor shall take the work from this point. Before depositing the bedding mortar on the concrete, the entire surface shall be well saturated with water to prevent the too rapid absorption of the water from the bedding mortar. Deposit upon the concrete a bed of cement mortar of two parts non-staining Portland cement, and three parts clean, white sand. Mortar shall be spread evenly over required surface to established floor level."

Carrere & Hastings in their general specifications for terrazzo require:

Concrete ground work shall be thoroughly swept and washed and lightly sprinkled with dry Portland cement immediately before terrazzo floor mixture is placed in position. Terrazzo shall be composed of hard white

marble chips and just sufficient mortar of one part white Portland cement and one and one-half parts white sand to fill the voids. This mixture shall be laid not less than one inch thick and marble chips shall be laid over the surface and rammed in."

Cass Gilbert, quoting from the specifications for the new National State Bank Building, Newark, New Jersey; specifies for terrazzo, which is all to be placed in corridors, as follows:

"All terrazzo is to be laid in the best manner, consisting of topping and bed; the topping being made of white Italian chips with best White Atlas cement and to be not less than one inch in thickness. The bed to be one inch thick composed of one part Portland cement, three parts coarse sand, and five parts clean gravel. On top of bed and laid coincident with same lay the terrazzo topping."

Shepley, Rutan & Coolidge write as follows: "We do not specify the composition of terrazzo floors, and we might add that the terrazzo is always placed on a concrete fill, all conduits and etc., being kept well below the top of the fill, otherwise we find cracks are apt to appear in the finish terrazzo."

Warren & Wetmore, architects for the new Grand Central station, New York, remark that they usually have the surfacing put on before the bed is thoroughly set.

In reference to terrazzo on wood floors, a superintendent writes: "I do not think it necessary to reinforce the base on a fireproof floor, and not on a wooden floor if laid properly in blocks." Another superintendent says that he has come to the conclusion "that good work cannot be assured when terrazzo is laid on wood base."

Contractors also vary in their opinions as to the necessity of reinforcing the base.

David Fishach & Co. of Baltimore, "recommend the use of BB lath 27 gauge, and placing the same between the base and the cushion coat, the only detriment in reinforcing the base is the expense it incurs."

The Levis Mosaic Co. of Boston do not consider it necessary to use reinforcement when the work is to be on a floor of fireproof construction.

Perhaps the most interesting reply to my inquiries is one from Waldo Brothers of Boston, who write as follows: "We do not think it necessary to use reinforcement in the following instances: 1. In small places (75 feet or less); 2. In old buildings where settlement has occurred a long time previous; 3. In places where there is a very thick concrete floor slab. We do think its use is necessary in the following cases: 1. In places where there is constant vibration: 2. In new buildings where there is sure to be settlement; 3. Where the concrete floor slab is not very thick; 4. Where terrazzo is to be laid over wooden construction."

In regard to the largest area that may be laid without expansion joints most superintendents favor the size as specified in the present office specifications, 4x4, 5x5, and in some instances 6x6. One superintendent states that an area 20x20 has been laid by him, and can be laid without danger of cracking; this opinion is also held by superintendents who have had large experience in this class of work. Instances of panels 16x16, and another 20x30, are cited with remarks that they have not cracked after three or four years' wear. Personally I know of two panels more than 200 feet in area, put in without joints of any kind, and without reinforcement, that have been subject to a great amount of traffic in a hotel lobby, that were put in nine years ago, and which show no signs of failure today.

In Memoriam

Albert Pissis

From out the starry interworld
He came a gleam of mellow light
To shine upon the path he trod
And build his spirit into stone
To man and God.

And resting all his hopes above
In steel and stone he interwove
Some fragment of the heart's desire
Some cords from out a tuneful lyre

And still his soul shall with us stay
In sombre stone or ambient clay
And in that place of rest and light
For us shall gleam a spirit bright.

Stretching his rule across the sky
In heights and depths that have no ending
And ever from unmeasured depths
To heights unmeasured still ascending

Gleaming and streaming with the light
That hath not length nor breadth nor height
Foundations that have never been
And heights no mortal eye hath seen

The master builder shall at last
Build Heaven and earth and ocean vast
And all the planets of the sky
And his own soul eternally.

W. G. Mitchell,
Bankers Investment Bldg.
San Francisco

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ARCHITECTURAL TERRA COTTA

Eastern trade publications antagonistic to the clay products industry, have been publishing some very serious accusations about the alleged failure of architectural terra cotta, particularly where used for cornice work. Doubtless the failures, if failures they really were, resulted from incompetent workmanship, just as concrete has been known to fail through improper mixture or absence of capable supervision.

As to the behavior of good architectural terra cotta under most extreme conditions, one need only turn back to the reports of engineers and other competent authorities, who investigated the conditions of the larger San Francisco buildings after the earthquake and fire of 1906. Referring to these conditions Mr. W. E. Dennison, President of the Steiger Terra Cotta & Pottery Works, writes us as follows:

If there is a single instance of terra cotta falling out of any of the heavy cornices of buildings then standing, I have yet to hear of it. I can say of my own knowledge, that there was not a single piece or cornice or heavy projecting courses in the Rialto Building, Monadnock Building and Grant Building that was displaced. I believe that such was the experience of all terra cotta manufacturers in this section. Should a piece of terra cotta fall out of any course of a building it would not be the fault of the terra cotta, but of the construction observed, which is always up to the architect, as he is the one who designs and specifies same. If terra cotta is not properly anchored and backed up, according to the laws of gravitation it will fall, the same as any other object will fall when released by reason of improper fastening.

The tendency of the times is to use terra cotta more fully and completely in building construction than ever before. The National Terra Cotta Society in its forthcoming textbook will show the architects and engineers of this country and the world the most approved methods of anchoring this material in the highest type of building construction known to modern engineers, and you, and all of you in your profession who are seeking to learn the representative merits of the best building materials can take due notice from such structures as the Woolworth building in

New York, the Smith building in Seattle and the Hobart building in this city, the latter now under construction, that terra cotta has come to stay in modern building construction, and that its head will be reared to the clouds when stone is relegated to the first few stories above the basement.

HERE'S A QUESTION

Do some contractors bother architects to the extent that they are a nuisance?

Answer—Ask Robert Halley, Jr., architect, Union building.

He says they do. Maybe he was only "kidding." But, also perhaps it is the reason why plans for two new residences are not announced. Also, it is the reason, he says, why contractors at large did not know of plans for the erection of an addition to the olive factory in Oldtown.

Go to it, boys, he's got some work for you.—San Diego Builder.

This brings up a ticklish point—the least said about which the better it would please—some architects. It is a fact that most architects have their favorite contractors and they do not care to be bothered by "outsiders." For this reason they hesitate about giving out information until contracts have been signed. The question as to whether this is fair to the owner is open to debate. It must be admitted that the opportunity to obtain a low bid is far more promising when a dozen men are figuring a plan. When only half that number are invited, architects explain that they are familiar with what these selected ones can do and they don't care to take chances with a stranger. On the other hand, is it wise to let the favored contractor feel so secure? If he thinks you have no use for an outsider he may be tempted some day to put one over on you—at the expense of the owner.

There is an architect in San Francisco who has posted a notice on his door declining to be bothered with contractors and material men with whom he has had no previous acquaintance or experience. Poor policy this, we think, for the architect who wishes to keep abreast of the times. Then there is another San Francisco architect who is so exacting with his work that when he sends out his plans he pledges the contractors to absolute secrecy and threatens to strike them off the favored list if they dare divulge the nature of the job or name of the owner!

ARCHITECTURAL EXHIBIT AT THE 1915 FAIR

Under the official classification of exhibits at the Panama-Pacific Exposition all drawings, models and photographs of completed buildings, artistic architectural details, landscape architecture and architectural engineering will form exhibit groups in the Department of Liberal Arts, which must be displayed in the Palace of Liberal Arts.

This department will comprise fifteen groups, covering the applied sciences, in which the exhibits will be notably interesting and significant. As the advances in architecture and architectural engineering have exercised a potent influence upon the improvement of conditions in economic life and the cultivation of artistic taste, the exhibits portraying this progress in the United States should be especially complete and characteristic to uphold the prestige of American ideals and effort as compared with the displays of foreign countries in the Palace of Liberal Arts.

The opening of the Panama Canal means the inauguration of a new and prosperous era by reason of the development of new avenues of commerce, and the Universal Exposition at San Francisco in 1915 will afford a rare opportunity to display the ideas and skill of American architects to the best possible advantage. The keen interest manifested by both American exhibitors and foreign governments assures an exposition of the most representative international character. Thirty-six foreign countries have already accepted the invitation of the President of the United States to participate, and forty-two States have likewise signified their intention to take part.

Plans Being Prepared

Architect Smith O'Brien, Humboldt Bank building, San Francisco, is preparing plans for a $10,000 residence to be erected on Jackson street, San Francisco. Mr. O'Brien is also preparing sketches for an Industrial Building to be erected on the Fair Grounds for the Workmen Packing Company.

With the Architects and Engineers

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Next Convention City—Seattle.

A Competition for Court House Plans

Burt county Supervisors at Tekamah, Neb., will get designs from architects for a $70,000 court house. The chairman and clerk of the board have been authorized to advertise a competition for the plans. It is intended to give certainty to the matter by having the architects make contracts that their proposed structures will not cost more than $70,000.

President	John Bakewell, Jr.
Vice-President	Charles Peter Weeks
Secretary and Treasurer	William Otis Raiguel
Directors	John Galen Howard and Louis C Mullgardt

Committees:—

Membership—Wm. C. Hays, Fred'k H. Meyer, and Geo. W. Kelham.
Architectural Practice—John Galen Howard, Clarence R. Ward, and Houghton Sawyer.
Entertainment and Program—Louis C. Mullgardt, Chas. P. Weeks, and Louis P. Hobart.
Allied Arts—Loring P. Rixford, J. Harry Blohme, and Albert Pissis.*
Publicity—Wm. Otis Raiguel, John J. Donovan, and E. Coxhead.
Education—Bernard R. Maybeck, Arthur Brown, Jr., and John Baur.
Competitions—Chas. P. Weeks, Wm. C. Hays, and John Reid, Jr.

* Warren C. Perry has been appointed to succeed Mr. Pissis, deceased.

$140,000 San Francisco Residence

Architect Edward G. Bolles of San Francisco, has completed plans for a splendid city home to be built at 22nd Avenue and Lake street, San Francisco, for Mr. L. B. McMurtry at a cost of $140,000. The design is Spanish renaissance. The house will be three stories, basement and attic and will have Dennison hollow tile wall with white cement plaster and terra cotta exterior, clay tile roof, metal lath partitions, reinforced concrete foundation, basement and floors, eight bathrooms all finished in tile, Mott plumbing specified throughout, hardwood finish throughout, incinerating and ice making plants, vacuum system of heating with oil burner, hot water in all rooms, indirect lighting system and garage in the basement with accommodations for six machines.

Quarter-Mile Track and Bleachers

Plans have been finished by Architect John Galen Howard of San Francisco, for concrete and frame bleachers and a quarter mile running track to be built west of California field, at the State University, Berkeley. There will be two bleachers, each 420 feet long and having 23 tiers. They will be built of timber on concrete foundations. There will be quite a little grading and some plumbing. A high fence will surround the track. The total seating capacity of the bleachers will be 11,000 persons. Plans are being prepared for a women's swimming pool to be built on the university campus, 40x75 feet and of reinforced concrete.

The Skyscraper of the Future

Here is a fairy tale from the Middle West, being a newspaper dispatch in the daily press:

DULUTH, Minn.—That the sky scraping office building of the near future will have many new features is the prediction of C. A. Patterson, secretary of the National Association of Building Owners and Managers, in addressing that body here today.

"Innovation," said Patterson, "is the middle name of the modern skyscraper. It will be but a very short time when big office buildings will have elevators running not only up and down from the street to the top of the building, but running horizontally on different floors. Furthermore, patrons will pay fares to ride on these elevators and get transfers from the vertical lifts to the horizontal, just as we get them on street cars now. They will pipe pure air from the country right into the big city buildings, just as they pipe pure water, and bungalows built on top of tall buildings will house the owners in summer. A building permit for such a bungalow already has been taken out in Chicago."

David Farquharson Dead

David Farquharson, pioneer architect and banker of San Francisco, died at his home in Sacramento street, July 17th.

Farquharson, who was president of the California Savings and Loan Society, came to San Francisco from Scotland in 1850. In the early days he was known as one of the city's most prominent architects. Among the buildings which he designed were the old Nevada Bank and the Bank of California.

He leaves a son, Charles D. Farquharson, secretary of the California Savings and Loan Society.

Architects Selected for Los Angeles Schools

The Los Angeles Board of Education has appointed architects to design 37 new school buildings, the total cost of which will amount to $1,470,000. Plans will be prepared at once. The list is as follows:

Six room and auditorium building, to Walker & Vawter, 1402 Hibernian building.
Four rooms and auditorium, to W. C. Pennell, Wright and Collender building.
Eight-room building, to H. W. Glidden, Wright and Collender building.
Eight rooms and auditorium, to Edelman & Barnett, 727 Black building.
Four rooms and auditorium, to John P. Krempel, 415 Henne building.
Four-room building, to George F. Costerisan, 922 California building.
Five rooms and auditorium, to Train & Williams, 701 Exchange building.
Four rooms and auditorium, to Parker O. Wright, 822 Security building.
Five rooms and auditorium, to C. F. Skilling, Garland building.
Four rooms and auditorium, to W. S. Garrett, 406 Currier building.
Four rooms and auditorium, to Dennis Hewitt, 618 Fay building.
Six rooms and auditorium, to Robert M. Taylor, 306 Douglas building.
Eight-room building, to Charles H. Kysor, Wright & Collender building.
Eight rooms and auditorium, Krucker & Deckbar, Ferguson building.
Eight-room building, Frank R. Schaeffer, H. W. Hellman building.
Twelve-room building, to Rea & Garstang, 720 Black building.
Sixteen rooms and auditorium, to Jos. B. De Remer, Title Insurance building.
Eleven rooms and auditorium, to Theodore Eisen & Son, 383 Wilcox building.
Twelve rooms and auditorium, to Hudson & Munsell, 415 Stimson building.
Eight rooms and auditorium, to A. C. Martin, 430 Higgins building.
Eight rooms and auditorium, to Withey & Davis, 1126 W. R. Story building.
Five-room building, to Montgomery & Montgomery, 805 Trust & Savings building.
Four-room building, to Frank L. Stiff, 715 Grosse building.
Four-room building, to Lester A. Hibbard, 906 Westlake avenue.
Four rooms and auditorium, to John F. Blee, Union League building.
Twelve-room building, to Hunt & Burns, 701 Laughlin building.
Intermediate school, to C. H. Russell & Co., Union League building.

All the above are Los Angeles architects.

Commercial Club to Have New Quarters

Architect C. W. Ratcliffe, Jr., Berkeley, has completed the plans for the Commercial Club's new quarters on the top floor of the Merchants Exchange Building, San Francisco. The drawings have been turned over to Frederick Whitton, 251 Kearny street. The work is expected to cost about $115,000. There will be a great deal of hardwood finish, marble and tile, elevator, etc.

$600,000 for Bridges

County Surveyor Butler has reported to the board of supervisors that 118 bridges will be required in San Diego county to cost approximately $600,000. A bond issue of $1,000,000 for the construction of these bridges and the building of highways in the county will be voted upon in September.

Southern California Chapter, A. I. A.

The proposed plan of reorganization of the chapters of the American Institute of Architects was ratified by Southern California Chapter at its last regular meeting. This was the special business before the meeting and came up in the consideration of the report of the Institute Committee on Chapters which was presented to the board of directors at its meeting in May.

Under the new plan of organization there will be two classes of members, (a) Fellows and Members; (b) Candidates of the Institute. This will do away with what is now known as chapter membership. Under the present plan chapter members obtain practically all the benefits that accrue to Institute members and by reason of their preponderance in numbers practically control chapter activities. This has been the cause of much dissatisfaction among the Institute members. If the new plan goes into effect chapter members will be designated as "Candidates" and will not be entitled to vote. An architect may become a "candidate" upon passing a satisfactory examination, providing ninety per cent of the chapter members vote for him. After the expiration of one year a candidate may be elected to membership in the institute. If he fails of election for five successive years he will be dropped. The Southern California chapter proposed that examinations be dispensed with in states which have a law licensing architects.

The new plan further provides that the Chapter-at-Large be abolished and that all members of the institute become automatically members of the chapter in the territory within which they are located. The Southern California chapter went on record as opposing associate membership including artists, engineers or amateurs. A standard form of constitution and by-laws for chapters is proposed. The institute committee on chapters will make its final report at the next convention in Washington and the plan of reorganization will be acted upon by the institute at that time.

New Residence Work

Architect Oscar Haupt, Phelan Building, San Francisco, is preparing plans for a $12,000 residence to be erected in San Francisco and Architect Alfred H. Jacobs, French Bank Building, has finished plans for a handsome residence to be erected on Lake street, west of 19th Avenue. At Kentfield, Marin County, about $20,000 is being expended on improvements to the Kent residence. The work is being done by day labor under the direction of Architects Bliss & Faville.

Personal

Architect William C. Hayes of San Francisco has removed from the Foxcroft building, 62 Post street, to the First National Bank building.

Architect Wins Suit

The case of Randall M. W. Wedgewood, architect, against Robert A. Jorgens, both of Grand Rapids, Mich., which has invited the direct interest of every architect in that city, was closed when a jury in Judge Perkin's court at Grand Rapids brought in a verdict awarding judgment of $170 for the plaintiff.

The case grew out of a transaction in which Wedgewood furnished plans for a building which was not erected. Payment of the account, $200 was refused, and the defense in court endeavored to show that the claim was not a valid one, because the plaintiff had not complied with the city ordinance requiring architects to take out a license and to pay an annual fee.

The interest of every architect in the city was aroused, as it is said that the ordinance has not been enforced and that license fees had not been paid as provided. Had the court determined that Wedgewood's claim was invalid because no license fee had been paid other architects of the city would stand a chance to be heavy losers if advantage should be taken of the decision.

Berkeley Boys Honored

Chandler Harrison of Berkeley, son of Mrs. S. I. Harrison, 2159 Vine street, was one of six hundred who successfully passed the examination for entrance to Beaux Arts, Paris.

Carl T. Warnecke, son of Mrs. C. Warnecke of 817 Forty-fifth street, Berkeley, achieved sixth place in the semi-annual competitive examination for admission to L'Ecole des Beaux Arts at Paris, France, in which over seven hundred of the best architectural students of the world were examined. Warnecke spent but three months in preparation.

Both young men were formerly employed in the office of Architects Bakewell & Brown of San Francisco.

Architect Welsh Better

The many friends of Architect Thos. J. Welsh of Welsh & Carey, San Francisco, architects, will be pleased to learn that he has recovered from his recent severe illness sufficiently to be at his office. Mr. Welsh suffered a stroke of paralysis. For years he has been one of the most faithful attendants to the Chapter meetings and his splendid reports as chairman of the Publicity Committee have been greatly missed.

$50,000 City Home

Architect Henry C. Smith of San Francisco has prepared plans for a handsome residence for Mrs. Clarence Musto to be erected on a marine view site at Vallejo and Divisadero streets, San Francisco. The house will be of reinforced concrete and will cost in the neighborhood of $50,000.

C. W. Dickey will Design Club Building

Architect C. W. Dickey, Central Bank building, Oakland, will design the new building for the Oakland Commecial Club at Broadway and Fifteenth streets. The owner of the structure is the Moffitt Estate. It has not been definitely determined whether to build three stories or thirteen stories, sketches having been made for both types of construction. If the building runs thirteen stories the three upper floors will be taken by the club. If only three stories are put up the club will probably occupy the entire building with the exception of the ground floor, which will contain stores and a theater. It is announced that construction work will probably not begin for six months, or until after election.

Architects for Shredded Wheat Biscuit Factory

Architects Hobart & Cheney, Crocker building, San Francisco, have been commissioned to prepare plans for the big factory building to be erected in Oakland by the Shredded Wheat Biscuit Company. The interior details were worked out by the company's engineering department and are now in the hands of the local architects. The building is to be Class A construction and will cost approximately $150,000. The greater part of the street frontages will be of glass, while the walls and floors will be of reinforced concrete.

Notice to Architects

Bonds in the sum of $250 000 have been voted by the citizens of Yavapai county, Arizona, for the erection of a new county court house at Prescott. The supervisors are advertising for competitive plans for the new building, in accordance with the laws of Arizona. The new structure will be erected on the site of the present court house and the entire amount of the bonds will be available for the building and equipment.

Another Architect Goes Abroad

Architect Fernand Parmentier of Los Angeles, has gone to Europe and will spend six months of travel on the continent. Mr. Parmentier expects to be back in Los Angeles not later than Dec. 1. Albert R. Walker, 1403 Hibernian Building, will perform the duties of the secretary of the Southern California Chapter, A. I. A., during the absence of Mr. Parmentier.

Fireproof Freight Shed

Plans are being prepared in the general engineering offices of the Santa Fe Railway at Chicago for a fireproof freight shed to supplant a frame shed now in use near the present passenger depot in Los Angeles. The building will be one story, 60 feet wide and several hundred feet in length. The construction will be either brick or reinforced concrete.

Heating and Lighting

Plumbing and Electrical Work

Ventilation — Artificial or Natural

By PAUL W. GOLDSBURY, M. D., Warwick, Mass.

TO SECURE a texture of air indoors that more nearly resembles that outdoors is the ambition of sanitary engineers who have anything to do with buildings or their construction. To live indoors and still enjoy some of the purity of the air that is to be found in the open is a matter of vital concern to the average worker, for the greater part of his day is passed under roofs and inside walls. Civilized man has been dwelling in his house for ages, adding comfort to comfort with apparently little regard as to what such confinement cost him in health and vigor. His eyes, however, have been suddenly opened, and that within a bare generation, for he has seen and known of the response which the "white plague" sufferer has made living under clear skies. He is learning something of the connection between the shut-in-ness of his office, shop and sleeping apartment and his occasional ills and ailments. He is being persuaded that where the real sick are doing so well there must be something worth while for him in the air tinted and colored by the sun and toned and perfumed by lake and stream, forest and field.

The human race has always needed shelter; a roof is wanted in all climates, either to protect from the rain and snow, or to shield from the light and heat of the sun. The play of the elements and the changes of temperature require walls also set so close as to shut away winds and cold. The house has been divided into compartments. Rooms afford individual privacy or establish limits necessary for business or housekeeping interests. In a thousand and one ways has the home and the school, stores, factories, and all sorts of buildings been made snug, comfortable, or divided up so as to anticipate every little thing which has to do with usefulness and service. The occupants have been protected from the struggles of the elements out of doors, and the changes of the seasons, and the structures have been more and more adapted and furnished and made to serve the man in his work, his studies, his whims, his pleasures. But the finished, the complex building is seen more and more to complicate and obstruct the free circulation of air. Man is so occupied with his art, his craft, his own creation, that he has forgotten the physical breath of life. The genius of the scientist and physician, the skill of the engineer and builder, all added to the concern and diligence of the janitor, have not met satisfactorily the problem of fresh air. The patient sufferer of tuberculosis, though compelled to be still, has been forced to listen to the stiller voices of nature, and learned lessons from her heart and ways which must become known everywhere.

All sorts of ventilating systems have been used and devised to introduce, purify, moisten, and change the air. To continually bring the large quantity of air necessary in factories, schoolhouses, and large public buildings, to wash out the dust, to heat, and at the same time keep up the humidity, entails an expense which seems prohibitive in the case of smaller buildings and dwelling houses. The demands for sufficient moisture where cloth fabrics are woven have long been realized and have been meet by the introduction of elaborate apparatus for humidifying the air. The popular recognition of the demands of the human fabric for moisture comes long after. To heat, to moisten, to remove the dust, and to supply the quantity of oxygen considered necessary for each individual, is only tackling a part of the problem in giving him the kind of air he needs.

How many people can be herded and boxed up together and not impair both their own health and the efficiency? The summer camp furnishes a marked contrast to the stuffy office and the winter apartment as to the tonic qualities of the free and fragrant air. Many of the newer banking and trust company offices show an evidence of a concession to that elemental fact that breathing space is necessary. The height of their ceilings seems to indicate something of a protest against the low-ceiled rooms of the day. It must be also a matter of good business policy to afford the high officials of such and other large institutions elbow room on all sides where they have important affairs to transact. Precision in work and clarity in mind and thought must be nourished by a generous amount of atmosphere. There are virtues in the high-vaulted cathedrals in the space afforded the heated and fouled air to rise and escape.

Two hospitals about the city of Boston have found quite a helpful suggestion from a very primitive source of architecture which they have adapted to their own needs.

The Indian tepee emphasized some very ordinary lessons in physics. The Indian is said to live in his own chimney; at any rate, he has more or less fresh air coming in the doorway or under his walls, and much of the bad air must, of course, follow the natural drift, rise and escape with the smoke of his fire at the apex. Windows are seldom kept open at the very top of a room, and even if they were the ordinary ceiling is horizontal, so that there are pockets or large spaces where the air is not changed. If the ceiling or roof slopes, then the air as heated tends to flow upward all the time from the rooms to drift into that uppermost space (in this case about 8 ft. across), under the ridge running the length of the building between the gables at the ends of the roof. In fact, that part of the roof is raised so as to allow windows to be put in on the other side. One is immediately struck in going through these buildings, particularly if any windows are opened below and above, at the freshness of the air. The currents from the ordinary levels to those under the apex of the roof seem to establish such a circulation that even the harmful odors and gases are wafted upward and entirely out of the building. When the air is still outside, that from within will come out of the windows opened on both sides of the roof. But with a wind, those on the leeward side, away from the direction from which the wind comes, only are opened. In that way, instead of the air being driven back in at the roof, it is sucked out. The genius of the white man has gone the Indian one better on that point. Of course, in such an arrangement the quantity of air passing in and out requires an extra amount of heat, but there are compensations. The response of the patients treated in these sanatoria seems to warrant the added cost of fuel.

In a broad study of all these considerations of purity of air and ventilation, one reaches the conclusion sooner or later that health is a matter of space, of variations in the character of the air, and that unobstructed nature is a master teacher in these arts.

The hospital structure above described, with ample grounds about it, should be thought of as at a stage about midway between the regions where the elements are free and untrammeled and the pretentious office building in the heart of a large city. In the latter no expense may be snared to introduce air from a strata or level beyond the range of the ordinary pollutions of the atmosphere. Such air may be further washed and cleansed, moistened and heated, but imagine it in the long and circuitous channels and conduits through which it is introduced into the building as robbed of many of the virtues which it may have possessed. The walls of this long route must more or less taint it or cause it to lose its varying character. It must seem to the occupants to have pretty much the same smell all the time. Is it actually or only scientifically pure? Scientific men are already coming to recognize that some of the standards formerly set up as necessary for a safe atmospheric condition are not so absolutely essential. Air may even have a high carbon dioxide content and not be so injurious, providing it is not in so stagnant a condition, but is subject to waves and currents and shows variations which react upon the skin and sensory nerve fibers, giving evidences of tonic and harmonic changes. Air must be conceived of as offering continuously impressions to the nose and skin, which gauge its value.

The problem of ventilation is rendered more and more complex where there is crowding, where the natural is replaced by the artificial. The trend of city development, the skyscraper, makes fresh air costly. Health is very costly, but life, after all, can not be valued. Is there not, then, an impassable wall in city life? Must not the city sooner or later disintegrate in favor of the country? Health must in the end be the measure of real efficiency. The artificial must bow sooner or later to the natural forces. The laboratory student, with all his earnestness, zeal and ambition in this behalf, has not as much at stake as the poor invalid who has to take to the woods for his life. The sensibilities of the latter are keyed up to protect his waning vitality, and may register discoveries beyond the delicate instruments of the former. Nature in all its nakedness and wildness must more and more be courted when and where it can best develop those sensibilities.

In all this, nature but compels man to return to her own side for instruction and life. Man has placed his laboratory too near the market place, too near congested centers, and, though he must study these conditions at close range, his scientific vision becomes blurred—the atmosphere, the fumes, the fret of the environment hammer are too much upon his perceptions, and so warp his conceptions, his results. He must know the life and various complications by experience. His conclusions, taken from one side, are sure to include error. His viewpoint must be ventilated, clarified by some of the lessons which those compelled happy for the life and all it affords and are desirous of sharing the good things.

Chauncey Depew says: "When I say that every man, every business, every institution, must be advertised in some way that will over and over again remind the people, I am only voicing the actual experience of every man, every business, every institution that has won lasting success."

* * *

Marshall Field said: "The worse the times, the harder we must fight for trade.

"In hard times the timid business man retires into his shell, but the far-seeing merchant doubles his efforts to get business."

The Editor's Mail

Questions on Any Branch of the Building Industry Will Be Answered Here

CONCRETE ROOFS FOR RESIDENCES

To the Editor:—Are there any residences in California with concrete roofs? How would you construct a concrete roof on a frame dwelling?

JAMES WYMAN, Builder.

There are a number of reinforced concrete houses in California having concrete roofs but we know of no frame dwelling with such a roof and would not recommend such construction, as the weight would be too great unless prior provision had been made in the superstructure to carry the extra load. In Los Angeles there are a number of houses with concrete tile roofs but here, too, it has been found necessary to materially strengthen the walls and rafters to carry the increased weight.

Concrete roofs are all right for ice houses, coal sheds, chicken houses, etc., but for the average dwelling, there is no better roofing than cedar or redwood shingles, or, if the house is in the mission or Spanish style, use galzanized iron, terra cotta clay tile, or felt and gravel.

* * *

Mr. Anton Evenstad of Lakota, N. D., has had experience in laying concrete roofs, as indicated by the following article in Concrete Cement Age:

"I have put on a few concrete roofs that are giving good satisfaction and have adopted the following method:

"I cover the roof boards, which are already in place, with brown building paper, although tar paper might be better, to prevent the boards from swelling. Over this I put on an ordinary poultry netting, lapping each strip 4 inches or 5 inches and wiring them together. When I put on the concrete I take precaution to raise up the netting so that it will be embedded in the concrete nearer, of course, to the bottom than to the top. For the concrete I use a 1:3 mix of cement and a well-graded sand. This mortar is put on 1½ inch thick and well worked around the netting. In the valleys I use tin exposed about 3 inches or 4 inches. Over the hips and ridges I double the netting. For very long roofs I put in double netting also, running two strips at right angles to prevent contraction cracks."—Ed.

* * *

CARDBOARD MODELING

To the Editor:—Will you advise me who works in cardboard models to scale? I have in mind a model of a complete manufacturing plant.

S. F. ARCHITECT.

There are a number of famous architectural and art modellers in the East as well as on the Coast. Berthold Andsley has specialized in factory and town work, his models being well known to attendants of automobile, cycle and engineering exhibitions in New York, London and Paris. Mr. Andsley's address is 151 W. 42d Street, New York.—Ed.

* * *

HOW A BERKELEY MAN SEES LOCAL CONDITIONS

To the Editor:—The following communication appeared in the Springfield (Mass.) Republican. It has no particular bearing on architecture but some portions of the article are so grossly unjust that I think attention should be called to the man who wrote it and he should be made to prove his accusations:

To the Editor of the Republican:—

Will you do mankind the favor of publishing the following letter in your columns? I hope others will republish it.

The papers of California are keeping the presses hot in holding out inducements to the easterner and others to come within its borders. There are inducements and opportunities here. California is a great state and is to be greater.

I love it and its peoples. I love my eastern fellow-men, too, among whom I have spent most of my days. For a year I have been studying California through a process of observation and inquiry among all classes in the chief cities and on the railways running the whole length of the state, with a view to discovering whether the opportunities for the laboring people and the business men were better West than East.

The following conclusions have been warranted and emphasized: A man well established East in any sphere is as well off as a like man here. The breaking away of such to go West is a mistaken and often disastrous move. There are just as good opportunities for business and getting a living East as here.

There are more able workmen out of employment here than East. An unskilled laborer has more openings there than here; a poor man is worse off here than in New England. Labor unions are more tyrannical on the Pacific than on the Atlantic. It is a bad policy for anyone to move to the far West excepting where health conditions demand a change, without abundance of money or an actual business engagement. Do not be duped by the rattle of the advertisers' guns. They are paid for the work by those who exploit their kind.

Just now 10,000 young women are called for to become waiters at the tables in the hotels during the expositions. Investigation by the Woman's Christian Temperance Union women proves that the "ad" is put out by a sporting man in the interest of the brothels and white slave department, and that not one of the victims responding will ever serve a table, but will become the helpless victim of lust behind bolted and locked doors. Cadets are going through all the land inveigling these unfortunate creatures into their nesbes. They often seize them by force and rush innocent girls away in automobiles.

WILLIAM P. CLANCY.

Berkeley, Cal., July 1, 1914.

Building Progress Throughout the Coast

Ice Company will Build New Factory.—Visalia—The Visalia Manufacturing Company, one of the oldest manufacturing concerns in Visalia, will build a new plant in the fall or winter to meet the growing needs of its business.

Christian Science Church.—San Francisco—Architect Edgar Mathews, Phelan building, has had his preliminary plans approved for the new edifice to be erected by the Third Church of Christ on Haight street, between Lyon and Central. Working drawings are now in course of preparation. The building will be similar to the First Church of Christ, also designed by Mr. Mathews, and will be of Class C construction, with exterior walls of tapestry brick. Cost will be about $75,000.

Building for Fresno Elks.—Fresno—Architects Glass & Buttner are preparing plans for a fireproof building of two and perhaps three stories, to occupy a site 175 x 75 feet, at Tulare and F streets, fnr F. M. Roessler. The Elks lodge has leased the top floor.

Million-Dollar Los Angeles Building.—Los Angeles—Architects Parkingson & Bergstrom, Security building, have been commissioned to prepare plans for a twelve-story Class A bank and office building to be erected on the northeast corner of Third street and Broadway, for the Rindge Estate. The building will be of fireproof construction throughout and will occupy a lot 87 x 121 feet, with marquise entrances on both Broadway and Third streets. The two upper floors are to be taken by a Los Angeles club.

Carnegie Library.—Vacaville (Solano Co.)—Vacaville is at last to have a Carnegie Library, the Trustees having secured a 75-foot lot at the southwest corner of Main and Parker streets. Plans have been prepared by Architect L. M. Turton of Napa.

Maryland Hotel.—Los Angeles—Financial arrangements for the rebuilding of the Maryland hotel at Pasadena have been made. Myron Hunt, 1017 Hibernian building, is the architect. The cost is estimated at about $200,000. The new building will be three stories, frame and plaster construction, and will contain, in addition to lobby, ballroom, dining room and kitchen, about 160 sleeping rooms and 100 bathrooms.

Millionaires' Colony.—Los Angeles — Architect Howard Shaw of Chicago is preparing preliminary plans for a clubhouse to be erected on the Palos Verdes ranch, between San Pedro and Redondo, Los Angeles county, as the initial step in the development and improvement of this 6,000 acre holding and the establishment of a millionaires' colony. Myron Hunt will be the resident and supervising architect.

Los Angeles Market Building.—Los Angeles—Architect Albert C. Martin, 430 Higgins building, is preparing plans for a new building to be erected at the northeast corner of Pico and Main streets, for Frank L. Forrester.

Buys Land at Hillsborough.—Eugene de Sabla, Jr., has sold a magnificent building site in the exclusive Highland Park district to J. C. Zellerbach, the San Francisco merchant, who will erect a beautiful country home.

Hotel in Prospect.—Sacramento—Tentative plans for a five-story hotel at the southwest corner of Sixth and I streets, on the site of the old Mier home have been drawn for the Mier estate.

Masonic Temple.—East Auburn—Architect Allen D. Fellows is preparing plans for a Masonic Temple to be erected here. It will be a two-story structure, 91 x 83 feet, with a department store on the ground floor and hall and club rooms above. Walls will be of brick and terra cotta, plate glass and patent store front, steam heat, tar and gravel roof.

To Build Fine Residence.—Samuel Lowenstein has purchased the southwest corner of Broadway and Webster streets, San Francisco, upon which it is stated he will build a $25,000 residence. Lot is 38 x 107 feet.

Three New Buildings for San Jose.—Three new buildings are shortly to be started in San Jose, representing an expenditure of a quarter million dollars.

One will be for the Young Women's Christian Association, plans for which are to be prepared by Architect William Binder, Rea building. This building will be of steel and brick, probably three stories high and will cost $100,000.

The Native Sons will spend $100,000 on a five-story reinforced concrete building to be erected on Second street, and the plans for this structure are being prepared by Architect Theodore Lenzen & Son, San Jose.

The third building will be erected by the Eagles and the plans are being prepared by Frederick Aiken, Theater building, San Jose.

Architect for Merced Theater.—Fresno—Architect Ernest J. Kump is preparing plans for a modern fireproof theater to be erected at Merced for C. H. Douglas and associates. The building will be 50 x 150 feet and will cost about $40,000.

Los Gatos Church.—Los Gatos—A contract for the erection of a Catholic church has been let to a local contractor, H. Hooper. Louis T. Lenzen of San Jose is the architect.

Sacramento's New City Jail.—Sacramento — Agreement has been reached between the City Commission and the County Supervisors whereby the new City Hall of Justice will be erected on the northwest corner of the Court House block, Sixth and H streets. According to the agreement, the architecture of the City Hall of Justice must conform to that of the Court House and County Jail now on the site. The building will house the city jail, police court and police headquarters, receiving hospital and health department. Architect R. A. Herold is now preparing the plans. The building will cost $250,000.

Brick Apartments.—Oakland—Architect William Wilde, Albany block, has made plans for a $20,000 three-story and basement brick apartment house to be erected on the corner of Twenty-third street and Harrison boulevard, Oakland, for Mr. R. Pozzi. The exterior will be of brick and cement plaster.

Plans for Hospital Building.—Architect Frank L. Thomson, of Eureka, California, is preparing plans for a private hospital to be erected in that city for John N. Chan, M. D., and others. The building will cost about $10,000 and will have accommodation for twenty patients.

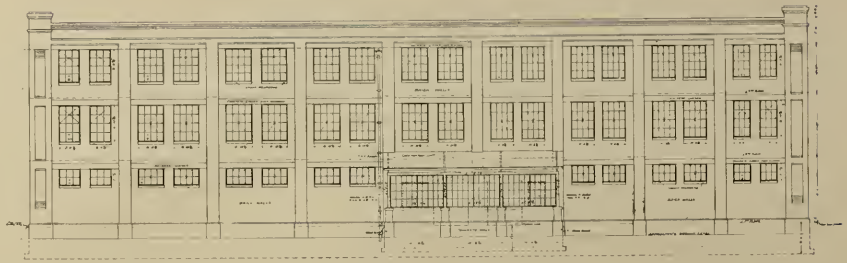
Dancing Pavilion.—Architects Cunningham & Politeo of San Francisco have prepared plans for a two-story dancing academy to be erected at Eddy and Jones streets, San Francisco, for Walter E. Dean. There will be about 200 tons of steel. The estimated cost of the building is $75,000.

Contract for Theater.—Architect C. O. Clausen, Hearst building, San Francisco, has let a contract to Charles Coburn for building a one-story frame theater on Devisadero street for Daniel Sullivan of Durham, California. Architect Clausen has also let a contract to build a four-story Class C hotel on Geary street, west of Larkin, San Francisco, for Frederick F. Heine, for $30,000.

New Science Church to Have Dome.—Architect William H. Crim of San Francisco has had his plans approved for a new edifice for the Second Church of Christ, Scientist. A feature of the structure will be a great dome sixty feet in height, supported by steel frame. The building will be erected on the southeast corner of Dolores and Cumberland streets and will be in the classic design. It will cost about $65,000.

Amusement Building

The Jefferson-Grand Arena Company, 426 I. W. Hellman building, Los Angeles, is completing arrangements for the erection of a large amusement building and ice-skating rink at the corner of Jefferson street and Grand avenue, in the City of Angels. The structure will be 300 x 180 feet and will cost $100,000. Ernst Horstman, I. W. Hellman building, is preparing the plans.



FRONT ELEVATION OF W. P. FULLER & CO.'S NEW MIXED-PAINT FACTORY, SOUTH SAN FRANCISCO
Wright & Rushforth, Architects

A Model Factory Building

THIS structure is, as it were, but a drop in the paint bucket of the Fuller outfit—for it is but one of a group of twenty-six buildings. The location of these factory buildings at South San Francisco is especially advantageous, affording both water and rail facilities for shipping, with electric and steam car service, bringing it within 20 minutes from their San Francisco warehouse.

From a modest beginning one building after another has been added to the Fuller settlement as the needs of additional business or the taking on of new lines has made this necessary. The original paint business of this concern began when W. P. Fuller, Sr., established himself in 1851, in Sacramento, after arriving on the Pacific Coast by way of Cape Horn. His partner was a Mr. Heather, and the firm name Fuller & Heather. In 1862 he removed to San Francisco and, Mr. Heather having retired, continued business alone. Subsequently a partnership was formed with Mr. W. F. Whittier, which continued until 1894, when Mr. Whittier retired and the present corporation was formed. Upon the death of W. P. Fuller in 1890, his son, W. P. Fuller, Jr., succeeded his father. Beginning with the representation of Eastern brands of mixed paints and white lead, a factory was established in San Francisco in 1875 and a Home Industry was started, one destined to be among the largest on the Pacific Coast. In 1898 the manufacturing plant was removed to South San Francisco, where it now stands, occupying a tract of 17½ acres directly on the water front, with ample Southern Pacific track facilities, and in addition a large steamboat which plies between its wharves and neighboring points. Already over one million dollars has been expended on the plant and the new building is only one indication of many which testify to home appreciation of thoroughly meritorious local products. While mixed paints and the famous Pioneer White Lead (which originated in 1877) were until recent years the specialties manufactured by W. P Fuller & Co., they have since added Interior Paints and Enamels, Varnishes, Lubricating Oils, Automobile and Wagon Paints, Floor Stains and Floor Wax—making their business, with the exception of the Window, Plate and Prism glass, in which they also do an extensive trade, one of their own manufacture.

One of the lines which they have recently added is that of Varnishes. For twenty-five years past they have been experimenting along this line, until they felt sure that they could produce a Varnish equal to any in the world. A most complete Varnish factory was erected, with the best type of machinery, some of it being of special design. $75,000 was expended on their Varnish Works, which are well worthy of a visit, in order to study the care with which the precious gums from Borneo, India, Africa, Australia, and the Philippines are first cooked and then thinned out with turpentine, afterwards being clarified, filtered, stored and aged. Naturally the Fuller Varnishes are already acquiring a reputation far beyond our own borders.

PLANT OF W. P. FULLER & CO., SOUTH SAN FRANCISCO, CALIFORNIA

The Mixed Paint Department has been one of steady growth since the beginning of the Fuller business. The new factory was designed by Wright & Rushforth and is now in course of erection. It is a steel frame building, 58.5 x 146, three stories in height, to cost $60,000, and is to be equipped with machinery of newest and most improved design. It will have two Van Emon elevators, Fenestra Steel Windows, Automatic Sprinklers, conveyors and trackage at both ends of building, etc. The machinery in this new building will be electrically driven.

W. P. Fuller & Co. will have exhibits of unusual interest at the Panama-Pacific Exposition. In the Mines Building they will show a model white lead factory, which they will enclose in a building 50 x 125. This will contain miniature machinery showing the complete process of manufacture. This exhibit will cost about $35,000.

The Fuller factory, while not the largest of any paint or any varnish or any lead factory in the United States, it can claim to be the largest engaged in all these lines and is certainly a monument most worthy of the ability, sagacity and industry of its founder. Of W. P. Fuller, Sr., a recent speaker at a Trade Banquet said most justly and most truthfully:

"W. P. Fuller, Sr., was one of the old-time business men, doing business not only on the lines of strict honesty, as the word is understood nowadays, but on the stricter usages of the old-time merchant; absolutely taking no advantage of anyone and allowing no advantage to be taken for his benefit by any of his employees.

"He was a man of sterling character, charitable and honorable in all his dealings, far-seeing and broad minded and attended strictly to the one line of business in which he was engaged, indulging in no speculations, taking pride in his business and its growth, and an honest and hearty interest in the welfare of his employees and fellow citizens. The aims and practices of the founder have been carried out by his successors—his sons, and the same honest policy has been followed at all times. The concern is probably the largest strictly mercantile concern on the Pacific Coast, the factory is the largest in the West in its line of business and the quality of the factory goods turned out is always of the very best possible.

"Mr. W. P. Fuller, Sr., started with no capital except his brains, integrity and honesty and his fortune was thus built up without any of the latterday methods. The corporation, unlike most corporations, is composed entirely of members of his family and not, as is usual, of numerous outside stockholders."

State, County and Municipal Engineering

Good Roads—Water—Sewers
—Bridges—Fire Protection

Disinfection of Sewage and Its Success in a Small City

By FRANK A. NIKIRK,
Consulting Engineer, San Jose, Cal.

THE College Park sanitary district which lies adjacent to the City of San Jose, Cal., was organized in 1905. The boundaries of the district were extended in 1907 to include Hanchett Park, an exclusive residential district, and now include an area of about 2.6 square miles. At present the population of the district is slightly over 2,000.

As originally constructed, the sewage disposal works consisted of a septic tank and two filter beds. The plant is located on the bank of the Guadalupe Creek, into which the effluent of the filters was conducted. The filters were built in a natural excavation; about two feet of creek gravel was placed in this. The filters were approximately 340 feet long; one was 12 and the other was 15 feet wide.

The beds were not underdrained; for this reason and also the lack of depth of the filtering material, they were never very satisfactory. They were early abandoned and the effluent of the septic tank was discharged directly into the creek.

When water was plentiful in the Guadalupe Creek this effluent was not a nuisance. For the past two years, however, there have been no freshets to cleanse the channel, the growth of vegetation has been very rank and the amount of water flowing in the creek has been far below normal.

Under these conditions, with the water in the Guadalupe containing a relatively low percentage of dissolved oxygen, it can be readily seen that conditions are not very favorable for the disposal of sewage by dilution. The growth of vegetation checks the tendency toward re-aeration, and an unsanitary condition is apt to exist.

Under such circumstances it became necessary to treat the effluent of the septic tank before discharging it into the creek, therefore a temporary plant for treatment with chloride of lime was installed while the present plant was being constructed.

A treatment plant of this type requires a supply of water with which to mix the chloride of lime; consequently a windmill and tank were constructed over a well that existed at the end of the septic tank. The hypochlorite apparatus was located in the tank frame, which was inclosed to protect the plant from outside interference, as a constant and uniform action is required.

The apparatus consists of a mixing tank and two storage tanks, each holding about 275 gallons, and a fourth tank, in which are located the devices for regulating the flow. The tanks are arranged so that the flow is by gravity throughout the entire plant. Each tank is provided with an outlet through which to draw the solids that settle out of the solution.

The chloride of lime is put into the mixing tank and the tank filled with water. During the filling the solution is thoroughly mixed. The stirring device consists of a sort of propellor on a shaft, suspended from the top of the mixing tank. The shaft is revolved by a ratchet device operated by moving a lever backward and forward.

After mixing, the solution is allowed to stand sufficiently long to let the greater portion of the suspended matter settle. The clear liquid is then drawn off into the storage tanks through an outlet six inches above the bottom, so as not to disturb the settled solids. More water is then turned into the mixing tank and the insoluble residue is stirred up and flushed into the outlet sewer. The operation is then repeated.

At the College Park plant three "batches" are mixed each morning for a twenty-four hour run. The third "batch" is drawn slowly from the mixing tank and into the storage tanks as the latter are being emptied. This method was adopted in order to use the maximum quantity of water, the greater flow being more easily regulated.

In small installations, irregular flow of the solution is common, due to the clogging of the measuring orifice by imperfectly settled solutions, or by flakes of calcium carbonate being formed in the solution tank by the absorption of carbon dioxide from the air.

In this particular installation the solution flows from the storage tanks to the regulation tank and is controlled by a float valve which keeps the liquid in the latter at a constant height. In the regulation tank is a half-inch brass tube extending from above the surface of the liquid down through a large rubber stopper in the bottom of the

tank. In the side of the tube is a three-sixteenth-inch hole which admits the solution. The rate of flow depends upon the head of water upon the orifice, and the desired rate may be obtained by raising or lowering the tube through the rubber stopper in the bottom of the tank.

From this tank the solution is carried through a four-inch vitrified pipe line to the outfall sewer, where it mixes with the effluent of the septic tank.

The sterilizing action of chloride of lime is very ably set forth by Professor Charles Gilman Hyde in a paper presented before the fourteenth annual convention of the League of California Municipalities at Santa Barbara in 1911 and entitled, "The Sterilization of Water Supplies by the Use of Hypochlorites." While Professor Hyde's paper refers particularly to the protection of water supplies, the action of hypochlorites is analogous in the purification of water supplies and sewage effluents. In both cases hypochlorous acid is formed, which gives up its oxygen in the presence of organic matter.

In designing disinfecting apparatus one of the important factors to be dealt with is the fact that calcium hypochlorite exerts a very strong corrosive action upon wood and most metals. In some cases the tanks are lined with cement mortar laid on metal lath; in others a resistant paint is used. The pipes should be well galvanized and the valves should be bronze. The plant should be well ventilated, as the dust arising when the drums of chloride are opened, and during the making of the solution, is very irritating to the eyes and the membranes of the head.

Details of Twin Peaks Tunnel Project

CONTRACTS soon will be let for building a tunnel through the hills known as Twin Peaks, San Francisco. The completion of this great bore will mean the development of 7,000 acres, approximately one-fourth of the entire land area of the city.

The plans and specifications have been prepared by City Engineer M. M. O'Shaughnessy and they provide for the construction of a tunnel capable of accommodating a double track electric railway with rolling stock of the most modern type. The easterly portal has been located on the plans at the junction of Market street, Castro street and Seventeenth street, and the westerly portal near Dewey Boulevard. The total length of the tunnel from portal to portal is 12,000 feet and the time of transit through it with high speed trains is estimated at 10 minutes. When this time is contrasted with the 30 minutes required to make the journey by the present street railway facilities, an idea may be had of what the tunnel will mean to San Francisco.

On account of the increasing traffic congestion on Market street, the city principal commercial artery, it is generally conceded that the time is not far distant when a rapid transit subway will be necessary under this thoroughfare. With this fact well established, the elevation, location and design of the easterly portion of the Twin Peaks tunnel were so drawn as to permit the continuation of the tunnel as a subway under Market street, with but slight alterations. For the present, the tunnel cars will connect directly with the surface tracks in Market street by means of a suitably constructed incline.

Immediately west of the easterly portal a large underground station has been provided to be known as "Eureka Station." This station will ultimately be a transfer point where surface passengers may transfer to subway cars or where passengers from a future Sunset Mission tunnel may transfer to subway cars and vice versa. Only the essential parts of the station will be built on initial construction. A steel beam structure was adopted, since it affords better opportunities for future extensions. Platforms 300 feet in length to accommodate 4-car trains connect at either end with stairways leading to the surface, where they terminate in artistic kiosks with red tiled roofs and rough plastered walls.

Consideration of grade, headroom and alignment require modification in the grade of Castro street between Sixteenth and Seventeenth streets, and a shifting of a portion of Seventeenth street near Market street. This latter requirement necessitates the purchase of a triangular parcel of land at the northwest corner of Seventeenth and Castro streets.

Commencing at the easterly portal the tunnel will ascend on a 3 per cent grade for a distance of 9,000 feet, an allowance being made for the additional friction of trains on the curves by reducing the gradient to 2.87 per cent on such portions. At the termination of this 3 per cent grade will be constructed a second station to be known as "Laguna Honda Station" at an elevation of 436 feet, the floor of the tunnel being 62 feet below. From this point the grade will descend at the rate of 1.15 per cent for a distance of 3,000 feet to the westerly portal.

On the surface and directly above the Laguna Honda Station in the tunnel will be erected a reinforced concrete depot. This building will be about 100 feet in length, constructed after the Mission style of architecture and provided with modern conveniences. Passengers entering the depot may reach the tunnel by means of one of six elevators located three at each side of the two lobbies, or in case of a possible disability of the machinery, may use the broad central railway descending 62 feet to the station below. The underground station will be 300 feet long, as at Eureka Station, and centrally located with respect to the elevators and stairways.

Two platforms 10 feet wide will be provided, one to accommodate eastbound and one westbound traffic. On account of the ample headroom available, the arched type of roof will be used, requiring a span of 44 feet. The elevators will have a capacity of 50 persons each and will consume about one minute in making the trip from the surface to the tunnel level.

In order to ascertain the character of the material through which the tunnel is to be constructed, borings were made along the route at intervals of from 300 to 400 feet. These borings indicate that, for a distance of 5,000 feet on the westerly end, sand and incipient sandstone will be encountered, passing then into hard Franciscan sandstone for a distance of 4,500 feet, and emerging therefrom into a red sandy clay for the remaining 2,500 feet to the easterly portal.

The inside dimensions adopted for the tunnel proper are 25 feet in width and 15 feet in height, and, as the borings indicate the presence of considerable water, the curve of arch was made semi-circular, the sides slightly curved; the construction of an inverted arch in the bottom is provided for, in case it is found necessary in order to resist the hydrostatic pressure. The standard section for the tunnel in soft rock is shown in Fig. 1. Details of the key joint are given in Fig. 2.

Owing to the fact that the difference between the grade of the overlying streets and the track grade would not permit the use of the arched type of tunnel section, it was found necessary to provide a subway section from Eighteenth and Hattie streets to Eureka Station, and from there to the easterly portal. For this subway a double compartment with a slab top has been designed. The greater part of this section will be built on curves. This will cause the ends and centers of cars to overhang the rails more than on straight track. On account of this a lateral clearance of 14 feet will be required. The overhead clearance of 15 feet will remain the same as in the tunnel sections. This section will be built through a wet clay, making a slab base imperative, in order to provide a stable foundation.

Throughout the length of the tunnel the contractor is given the option of using brick or concrete in the upper portion of the arch ring. To relieve the water pressure, deep holes have been provided at intervals of 25 feet along the length of the tunnel through which the water will find its way and be carried off by means of a vitrified pipe laid in the center of the tunnel, which will be covered by broken rock ballast supporting the ties and rails of the tracks.

Throughout the entire tunnel a 12 per cent mixture of hydrated lime will be added to the concrete, which, together with a rich mixture of cement and sand applied with a cement gun, it is believed will afford sufficient waterproofing for the tunnel and subway sections. About Eureka Valley Station, where leaks and water stains would be more offensive, three-ply felt waterproofing is to be laid on the top and sides of the structure and covered with porous book tile, through which water will percolate and be drained off through the interior holes to weep holes at the base of the station.

The important matter of ventilation has been given much attention, and the plans call for the construction of a circular vent shaft near the Relief Home, capped by a head house or air intake of attractive design on the surface. In this shaft and at Eighteenth and Hattie streets, electrically driven blowers will be installed. These blowers will draw fresh air from the atmosphere and force it through an air duct formed between the upper portion of the tunnel arch and a suspended reinforced concrete slab ceiling from which it is allowed to escape at intervals through dampers into the tunnel proper, and thence to the surface at the portals and stations.

In each wall of the tunnel lining will be placed 11 fibre ducts for the accommodation of cables and wires transmitting the electric current for the operation of the trains and for lighting the tunnel and stations. At intervals of 50

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feet, alternating on opposite sides of the tunnel, niches will be constructed in the walls in which will be placed an incandescent electric light. These niches will serve as refuge bays for track walkers, and in some access may be had to the ducts carrying the power wires.

The estimated cost of the construction of the tunnel, including the purchase of lands for rights of way and other incidental expenses is $3,994,289.23.

Oakland Skyscraper

Architect C. W. Dickey has been commissioned to prepare plans for a ten-story Class A store and office building to be erected at Fourteenth and Washington streets, Oakland, on the property controlled by the trustees of the University of California. Mr. Dickey has prepared preliminary plans and they will be submitted to the Trustees at an early date. His drawings call for a ten-story building on Fourteenth street and a three-story building on part of the lot on Washington street. The lot is 100 feet square, and it is desired to spend $350 000 at present. Actual construction will start sometime in the early part of 1915.

New Residence Tract

It is announced that the Spring Valley Water Company has decided to convert some of its properties at the edge of the Presidio, near Sea Cliff, San Francisco, into a high class residence tract, and to this end surveys have been made by Engineer Mark Daniels. Monadnock building. Architects Willis Polk & Company will plan the ornamental entrance gates, fences, posts, etc.

The Early Bird

The brass plate on his door proclaimed to the world at large and the people of Pipton in particular that Binks was an architect.

Binks had been six months in Pipton, and, though he felt sure of doing great things, had only built a dog kennel for his landlord and overdrawn his account at the bank.

One night, however, at about 11 o'clock he might have been seen tearing along the deserted streets to the outskirts of Pipton, where resided Mr. MacAlico, the big local shop keeper.

The house was in darkness when he arrived, but his energetic use of the knocker soon brought Mr. MacAlico to the door.

"Good evening!" panted Binks, "I have just come to ask if you wish me to design a new front for your place in the High street?"

"Confound you for waking me up, you idiot! Certainly not! My shop front is perfectly satisfactory, and will last out your lifetime!"

"Oh, no, it won't!" retorted Binks, "for it was knocked into smithereens about half an hour ago by a motor bus!"

The contract was signed the next morning.

Compensation

By PAUL W. GOLDSBURY, M. D., Warwick, Mass.

Mary Ann, while cutting bread,
Cut her finger. With elation
Mary Ann went off to bed,
Claiming compensation.

William Jones, while carting coke,
Bruised his shin. With jubilation
William cried: "Happy stroke,
One year's compensation."

Charles, the waiter, dropped the cheese,
Hurt his toe, retired from waiting.
Six months' claim. At Brighton he's
Now recuperating.

Jane, while cooking, trod and slid
On some fat and fell obliquely;
Interesting invalid,
Drawing two pounds weekly.

Jack, the hodman, scratched his wrist,
Scratched it with a scaffold splinter;
On the compensation list,
Resting for the winter.

On the job at Maiden Vale,
With his hammer, Green, the plumber
Hit the wrong nail (finger nail);
Resting till next summer.

Bless the goodness and the grace
And the thoughtful legislation
That conferred upon our race
Workmen's compensation.

—London Chronicle.

PRIVATE TELEPHONE SYSTEMS

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By the Way

Some Industrial Information Worth the While

A Low Priced, High Grade, Stationary Vacuum Cleaner

There has been a strong demand for some time past for a stationary vacuum cleaner, suitable for operation in bungalows and medium sized houses, which, while being efficient and high grade, must also be low in cost. With the rapidly increasing detail in house work, the housewife is demanding a relief from the drudgery it entails.

The application of electricity in the home for use in operating sewing machines, washing machines, vacuum cleaners, etc., is relieving the housewife of the mechanical and unpleasant features and at the same time gives her more time for social intercourse and education.

Of all these improvements, the vacuum cleaner is the most important, and the introduction of the B. & W. cleaner is a long step in advance of previous practice. This cleaner is driven by electricity, and consists of a quarter H. P. motor, directly connected to a centrifugal fan in a vertical position. The fan is so made that it forms a cover fitting over a cylindrical metal tank, into which the dust is drawn. The cover is fitted with a felt ring, so that when in operation there will be no air leakage. The vacuum maintained in the steel tank is sufficient to hold the cover in place and it is otherwise free.

The metal tank is about eighteen inches in diameter and about two feet in depth, at the bottom of which is a cast iron trap-door held in place by a refrigerator type of lock, the trap-door being also fitted with a felt ring. The tank is supported by three cast iron legs of angle beam section, so that when assembled, the cleaner stands about thirty inches high. The tank is equipped with an inlet at one side, through which the dirt is drawn, same being thrown downward by a deflector inside the tank, so that the heavier particles are dropped immediately above the trap-door. The lighter particles held in suspension arise with the outgoing air to a cylindrical screen or filtering cloth, where the dust is separated and the screened air passes out through the fan.

In installing this cleaner in a house, two-inch galvanized iron pipe of twenty-six gauge is recommended. Standard elbows and fittings are carried in stock for this size pipe and it is only necessary to give the joints a coat of heavy asphaltum paint and slip them together. As soon as the paint hardens, the joints will be air-tight. Polished brass floor plugs are provided for use with the cleaner and can be installed flush with either base-board or floor. Fifteen feet of flexible special 1½-inch rubber hose is furnished with this equipment, and a various assortment of tools for use in cleaning. A cleaner of this type can be installed in the ordinary bungalow for approximately one hundred dollars ($100.00), with suitable outlets in the floor throughout the house, so that the housewife need handle only the hose in cleaning. Once every month or two the housewife can empty the tank in the basement. With the stationary type of cleaner, there is a real ventilation of the room, as all dirt and foul air is drawn to the basement, where the cleaner is installed. With this type of cleaner, it has been found that the housewife does not have to dust the house one-half as often as with the portable bag type of cleaner.

To start and stop the cleaner, push button switches may be located on the various floors of the house, so that the maximum of efficiency with a minimum amount of labor is obtained. The housewife will welcome the advent of a moderate priced cleaner, which will do excellent work, and the builder will find a more ready sale for the house so equipped. This cleaner is made right here in San Francisco, and Arthur T. Riggs, 510 Claus Spreckels building, is the local distributer.

A Durable Wood for Bridge Planking

A new draw bridge has recently been erected by the Board of Supervisors of Sonoma County over Washington street in Petaluma. It is a fine modern steel structure in line with the improvements which the United States government is making in the dredging of Petaluma creek. Recently, a large sum was appropriated by congress for the deepening and widening of the channel and also the straightening of some of the curves. After making tests on various woods in order to obtain the most durable planking, the engineers decided upon the use of California laurel. The bridge is now completed and the laurel has made a fine job and is proving very satisfactory.

Laurel is an ideal wood for bridge and wharf planking as its compression tests show it to be one of the most durable of woods. Another important point is that

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having a compact grain, it wears smooth and does not splinter, while its cheapness, as compared with other hardwoods, makes it more available. The initial cost of laurel planking is greater than that of Oregon pine or cedar planking, but the longevity of laurel more than offsets the difference in price.

Kinnear Manufacturing Company Establishes Factory in San Francisco

It will be a matter of considerable interest to Architect and Engineer readers to learn that the Kinnear Manufacturing Company of Columbus, Ohio, have added San Francisco to their list of branch offices in this country, thereby showing their faith in the future of the Exposition City and their belief that the business in this part of the country justifies the expense contingent upon operating their own office for the exclusive sale of the Kinnear steel rolling doors and shutters.

At the present time, in addition to the main office in Columbus, Ohio, the Kinnear Manufacturing Company maintains branch offices in Boston, Philadelphia, Chicago, Cleveland, Detroit and Minneapolis, and the fact that the new San Francisco office is the only one in the western part of the country indicates firm belief in the supremacy of San Francisco west of the Rockies.

Some of the more notable installations of Kinnear doors and shutters in this territory are the six new docks on the San Francisco waterfront, the doors for which alone cost more than $130,000. The freight sheds of the Santa Fe Railway Company throughout California are almost exclusively equipped with Kinnear steel rolling doors. The Standard Oil company of California also is using many of these doors.

The splendid results shown by the Kinnear doors at the time of the San Francisco fire are well known to the average architect and contractor on the Pacific Coast, and as a result of their wonderful showing in the Pacific Telephone and Telegraph Company's main exchange building in San Francisco, that company has since the fire equipped the greater number of their offices from San Diego to Seattle with Kinnear products.

For warehouses and other buildings where the handling of freight at the minimum expense is a great consideration Kinnear doors have been used in large numbers, and at the present time several of the buildings of the Haslett Warehouse Company use these doors for their freight entrances. Kinnear doors are also used by the following well-known firms in and around San Francisco:

J. A. Folger Co., The Emporium, A. Shilling & Co., Goldberg-Bowen & Co., Holbrook-Merrill & Stetson Company, Weinstock-Lubin Company, H. S. Crocker Co., Shreve & Co., Thompson-Diggs Co., Nathan-Dohrmann Co., as well as many others.

W. W. Thurston, formerly vice-president of the Lilley & Thurston Company, who have been agents for the Kinnear Manufacturing Company for many years, has been appointed district manager with headquarters in the Rialto building, San Francisco.

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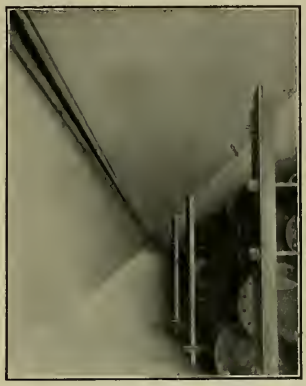
How to Waterproof Concrete

THE permeability of concrete to moisture makes the use of a dampproofer most essential. There are many waterproofing compounds on the market, many of which have undoubted merit. The Hercules Waterproof Cement Co., of Buffalo, N. Y., claim to have "the only practical, efficient and everlasting material which strengthens and waterproofs concrete." These strong claims are backed up by a long list of buildings devoted to various purposes on which (or on portions of which) Hercules has been used. These include basement walls, cellars, swimming pools, silos, factories,



This Tunnel of the Soldier's Home at Washington, D. C., 400 feet long, 6 feet high, and 3 feet wide,—was made Water Tight by the application of a plaster coat, on the inside of the Tunnel, of Hercules Waterproofing and Strengthening Compound, incorporated with Vulcanite Cement.

Esenwein & Johnson, Buffalo, N. Y., Architects John Gill & Sons, Cleveland, Ohio, Contractors

Hercules Waterproofing and Strengthening Compounds used in the aggregate for waterproofing the foundation walls and footings and in the cement plaster for the columns on the Battery Room of the Buffalo General Electric Co.'s new office building.

concrete bins, grain elevators, tunnels, churches, cisterns, coal bins, reservoirs, etc. Letters are published stating that after many months—even years—of practical use, the Hercules Compound has been found most effective and successful in waterproofing and strengthening the concrete. A sample letter is printed herewith, showing the results on some difficult government work:

WASHINGTON, D. C., September 8, 1911.

HERCULES WATERPROOF CEMENT COMPANY,
Buffalo, N. Y.

Gentlemen:—* * * I have the pleasure and satisfaction of writing you regarding our experi-

MORTENSON CONSTRUCTION CO.
CONTRACTORS FOR STRUCTURAL STEEL AND IRON
H. MORTENSON, PRES. CHAS. G. MORTENSON VICE-PRES. AND MGR.
OFFICE AND SHOPS: CORNER 19TH AND INDIANA STREETS
PHONES: MISSION 6033—HOME M 3916 SAN FRANCISCO, CAL.

These mills of the Buffalo Cereal Company, Buffalo, New York, are built entirely of concrete. Foundations waterproofed with Hercules Waterproofing and Strengthening Compounds. Grain bins waterproofed with Hercules Liquid Waterproofing.

ence with Hercules Waterproofing Compound in plaster coat used to waterproof the inside of new reinforced concrete tunnel, 4,000 feet long, 6 feet high and 5 feet wide. We used 2½ per cent Hercules Compound (by weight) with the cement, and a mixture of one to two of Vulcanite cement and fine granite screenings, applied in two coat work,—first coat about ½ inch thick, second coat ⅜ to ½ inch thick with a brush finish. The tunnel is perfectly dry since plastering was completed. * * *

Trusting that on your representative's next visit to Washington he will come out and see our finished work, I am,

Very truly yours,

A. A. Hileman,
Engineer, U. S. S. H.

The Hercules Waterproof Cement Co. invite correspondence on any dampproofing problem. Their address is 705 Mutual Life Building, Buffalo, N. Y.

THE RIALTO BUILDING
Kansas City, Missouri
is a fourteen-story office building, built for all time. Hercules Waterproofing and Strengthening Compounds was used to waterproof and strengthen the basement walls and floors.

THE HOMEWOOD AVE. M. E. CHURCH,
Pittsburg, Pa.
The basement walls in this church waterproofed by the use of Hercules Waterproofing and Strengthening Compound.

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Foreign Department For Glidden Varnish Company

Mr. Fred. A. Glidden, newly elected president of the Glidden Varnish Company, sailed on Thursday, July 23d, with his family for a combined business and pleasure trip through Great Britain, Norway, Sweden, Germany and France.

Some three years ago the Glidden Company established a complete foreign department of their business and have been shipping their products throughout the entire civilized world. Their success during the past ten years has been phenomenal, due largely to their splendid organization consisting of various departments of research and sales. The new plant in Cleveland comprises seventeen acres, ten of which are covered with modern concrete fireproof buildings, enabling them to produce the highest quality of goods at a minimum cost, and places them in a position to compete with the world on varnishes and paint specialties.

Merit System in Los Angeles

The new merit system first introduced on the Pacific coast by Willis Polk & Co., of San Francisco, has been adopted by Architects Parkinson & Bergstrom of Los Angeles, for governing the construction work of the new Citizens' Bank building at Fifth and Spring streets in that city. The system places the different contractors employed on the job in a position where they have to look out and see that they are not delaying the game. The penalty of having a red check mark noted against them on the bulletin board, which is displayed on the building, would not look well to the public.

Have Opened Sacramento Warerooms

Heath & Milligan Mfg. Company, whose San Francisco offices are at 9-11-15 Fremont street, have opened warerooms at 1002 J street, Sacramento, where supplies of their paints, also full information about their specialties may be obtained. Emerick & Duncan Co. are their local managers.

Valuable Addition to Building Material Firm

W. D. Bates, formerly of R. B. Guernsey Co., has been admitted as a member of the firm of C. Roman Co., San Francisco building material specialists. Mr. Bates will handle the paints manufactured by this concern, having had ten years' experience in this line in San Francisco.

Convention of Paving Brick Men

The National Paving Brick Manufacturers' Association, Secretary, Will P. Blair, 832 B. of L. E. Bldg., Cleveland, Ohio, will hold their eleventh annual convention and paving conference at Buffalo, N. Y., September 9, 10, 11, 1914.

Reviews of Recent Books

of Interest to the

Architectural and Engineering Professions

By CHARLES HENRY CHENEY, Architect

REPORT OF THE HEIGHTS OF BUILDINGS COMMISSION OF THE CITY OF NEW YORK. Issued by the President of the Board of Aldermen, N. Y., 1914. Cloth 8vo. 295 pp. Illus., 19 diagrams and 21 maps.

This most interesting, careful, and exhaustive report on the increasing height of buildings, evils arising therefrom, and how the matter has been and may properly be controlled, will undoubtedly be very welcome to all architects and engineers.

There are few members of the profession who have not at some time or other given serious thought to the unregulated and unlimited high buildings which this country has produced—not particularly to meet the demand for an essentially American architecture, as sometimes stated—but really resulting from lack of the legal restraint which is imposed in every other big country of the world in self-protection.

In New York city conditions have become increasingly bad in recent years, but they are only typical of the other large cities of the United States. The nation's metropolis has therefore done the whole country a service in this report, because there are here compiled not only statistics, tables and analyses of existing conditions in New York, but also summaries of legal decisions as to the constitutionality of regulation through the police power for public health, safety, comfort and convenience. The height limitations in the principal American and European cities are given and also "districting and zones," as established from Los Angeles to Baltimore and the cities of Germany.

The conclusions and recommendations will form a basis for legislation in every city on the Pacific Coast. Nowhere else in print can there be found such complete and up-to-date material bearing on this subject. New York appointed an advisory committee consisting of some of the most prominent architects, lawyers, merchants, engineers, and real estate experts of the country and appropriated $15,000 for the scientific preparation of all data to be had. A city-planning expert was appointed secretary and the hearings conducted brought out facts and theories from practically everyone entitled to be heard, the most important of which are printed in the appendices.

These also contain the present restrictions in height, size, and arrangement of buildings in New York city, German zone regulations, building restrictions in various cities, the English and Swedish Town Planning acts, relation of high buildings to extra insurance, tabulation of vacancies in high buildings, and proper angles of light.

THE HISTORY OF THE DWELLING HOUSE AND ITS FUTURE, by Robert Ellis Thompson. 173 pp. 8vo. No illus. Philadelphia. (J. P. Lippencott.) $1.00.

A most refreshing and delightful history, written with that rare simplicity and touch of humor that hold one to the end, this book will be appreciated both by the profession and by laymen. We are too apt to forget that most of the conveniences of modern residences are of relatively recent origin—that, for instance, the Greeks and Romans and early Christians never knew the principle of the chimney, which was not discovered until the eleventh century in Normandy.

The author has skillfully traced the development of the habitation from the old halls (Skali) of the Norsemen, through the medieval half timbered houses down to our modern homes, with just enough historical fact and anecdote to make the reading more than agreeable. The author's ideas as to future modes of living are piquant and sometimes at bit startling. The awful waste of present-day housekeeping and its remedy is a subject that will interest everyone.

THE HOLLOW TILE HOUSE. By Frederick Squires. (Wm. T. Comstock Co. New York.) Cloth, 208 pp., 215 illus.

The hollow tile house has come to stay and this book should answer all the questions with which clients are wont to embarass the profession. Profuse in illustrations well selected from this country and Europe, it expresses much of the enthusiasm and success in design which marks the houses of the author. As an architect, Mr. Squires needs no introduction, his residences being too well known, and frequently displayed in all architectural magazines of the past decade. He has brought out in a practical and reassuring way what his years of experience with an increasingly popular new building material have produced.

CASPAR'S TECHNICAL DICTIONARY—ENGLISH-GERMAN, AND GERMAN-ENGLISH. (C. N. Caspar Co. Milwaukee.) Cloth, pocket size, $1.00.

A practical German dictionary of convenient size which gives the most important words and terms employed in Technology, Engineering, Machinery, Chemistry, Navigation, Automobilism, Aviation, etc. It aims particularly to cover technical words and phrases which came into use during the last decade, and forms a supplement to former larger and more general dictionaries.

Vitruvius: The Ten Books on Architecture

This wonderful book, just issued, was translated by Morris H. Morgan, Ph.D., LL.D., late professor of classical philology in Harvard University. It was edited for publication by Albert Andrew Howard, Ph.D., pope professor of Latin in Harvard University. The plans and illustrations were prepared by Herbert Langford Warren, A. M., and Nelson Robinson, Jr., professor of Architecture in Harvard University.

Probably no treatise ever written has exercised a greater influence upon the classical tradition in architecture than have the Ten Books of Vitruvius. The author was probably a contemporary of Augustus; he was at any rate more than a builder and engineer. Incidentally, he gives many glimpses of the life and daily thought of his times, as it affected the architect; and his evident study of Greek philosophy and science contribute to make his work the most important literary medium through which the principles of ancient classical architecture have been transmitted to modern times. With the exception of one treatise on sewers, he furnishes the only contempo-

rary description of Roman methods of building. From the early Renaissance—when Vitruvius was the final authority studied by Bramante, Michelangelo, Vignola and Palladio—until a recent date, the architecture of almost all European countries has owed much to this treatise. It forms, therefore, a commentary not only on actual ancient methods, but on the aims and inspiration that guided the modern classical revival.

The translation is the work to which the late Professor Morgan devoted the last years of his life.

Published by the Harvard University Press, Cambridge, Mass. $3.50 net.

Another Southern California Brick Industry

The Pacific Sewer Pipe Company, long and favorably known throughout Southern California as extensive manufacturers of vitrified clay products, recently has entered the brick field and is manufacturing a superior quality of pressed brick and tile for modern building adornment. The entire output is made right inside the corporate limits of the big southern city. The company controls six separate plants, devoted entirely to the manufacture of clay products and at the present time four of these are in active operation.

The line of brick produced is a varied one and extensive enough to interest any architect or owner. They make several colors and types of regulation pressed brick, also the very popular "ruffled" brick so attractive when laid up with wide-open-raked mortar joints. They are also making a superior grade of enameled and mat glazed brick, in addition to fire brick in all required commercial shapes.

The enameled brick are made by the double burner process, ensuring true dimensions, and it is claimed the enamel is burned to a higher heat than any other brick on the market, making it harder of surface and more homogenous with the body of the brick.

Among the recent buildings supplied with their white enameled brick are the new United States government post office at Pasadena, the supplying of which is in itself a testimonial to the quality of the product, and also the new twelve-story Stowell hotel on Spring street in Los Angeles; this building being supplied with their transparent green glazed brick. The attractive facade of the new building of the Pacific Telephone and Telegraph Company on Hill street, Los Angeles, is laid with the Pacific's Golden Ruffled brick.

The company is now selling and introducing their brick all over Southern California, and gradually extending the business outside the Southern portion of the state. The management would be pleased to correspond with architects and owners and on request send samples of the brick.

The yards and offices are now located at 801-825 East Seventh street, Los Angeles.

STEEL LOUVRE TOILET DOORS

VENTILATION WITHOUT VISION

The new steel louvre doors installed in the Consolidated Gas Building, New York City, by the Dahlstrom Metallic Door Company, represent the latest development in this type of dor and eliminate the objectionable features found in the old style louvre doors, or doors having ventilators in one or more panels. The inclined slats in the old style doors allowed vision through the doors in a downward direction from one side and upward from the opposite side.

The louvres or ventilators in the Dahlstrom doors are constructed in a manner to obstruct all vision through the doors from either side, at the same time affording perfect ventilation. They are more attractive than the old style slats and present the same appearance from each side. On account of the formation of the bars in the louvres they are very much more rigid and stiff than the inclined flat slats. They are made in the cold drawn process and permit of any desired ornamentation within reason.

We also construct louvres pivoted at the side to close when ventilation is not required.

Write us for further information and prices.

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Current Prices of Building Materials

These quotations furnished by reliable San Francisco and Los Angeles dealers

(Names and addresses will be supplied upon request.)

SAN FRANCISCO PRICES

Common Red Brick, $6.50 per M, ex. cars.
No. 1 Pressed Brick, $35.00 to $40.00 per M; Wire cut, $35.00 per M.
No. 1 Red Pressed Brick, $20.00 to $30.00 per M.
Red Stock Brick, $12.50 per M.
California Portland Cement, C/L $2.30 per bbl.; L.C.L. $2.55 per bbl.
White Cement: Atlas, $6.00; Medusa, $6.80 per bbl.
Sand and Gravel mixed, 70c per ton.
Sand, 75c per ton.
Bank Sand, $1.00 per cu. yd.
Roofing Gravel, $1.40 per ton.
Crushed Rock or Gravel, 75c per ton.
Red Roofing Tile, $22.00 to $25.00 per square, laid.
Brick Lime, $1.35 per bbl., C/L.
Finish Lime, $1.50 per bbl., C/L.
Hardwall Gypsum Plaster, $9.40 per ton, C/L, ex. whse.
Oregon Pine, Rough Common, 1 x 3 to 1 x 10, $14.00.
Oregon Pine, Rough, 2 x 3 to 2-12, $15.00.
Oregon Pine 1 x 4 T. & G. Flooring, No. 1, $35 per M; No. 2, $32; No. 3, $26.
Oregon Pine T. & G. Ceiling, No. 1 and 2 mixed, $27 to $30.
Redwood, Rough Common, 1 x 4 and up, $22.00.
Redwood, Rough Common, 2 x 3 to 2 x 10, $22.00 to $24.00.
Redwood Rustic, No. 1, $36.00; No. 2, $32.00.
Redwood Ceiling, No. 1, $32.00; No. 2, $28.00.
Redwood Shingles, No. 1, $2.80 full count.
Red Cedar Shingles, Star-A-Star, $3.00 full count.
Pine Lath, $1.85 to $2.00.
1 x 3 Oak Flooring, Q. S. Clear, $120.00 per M; Select, $80.00 per M.
½ x 2½ Oak Flooring, Q. S. Clear, $96.00 per M; Select, $74.00 per M.
1 x 3 Maple Flooring Clear, $75.00 per M; Clear White, $105.00 per M.
White Lead in Oil, 8½c per lb.
Dry Red Lead, 8c per lb.
Boiled Linseed Oil, 77c gal. Raw Linseed Oil, 74c gal.
Turpentine, per gallon, 63 to 70c in bbls.
Hyloplate Blackboard, 25 to 35c per foot, installed.
Composition Flooring, 25 to 30c per foot, laid.

LOS ANGELES PRICES

Common Red Brick, No. 2, $4.50 per M.
Clinker Brick, $9.00 per M.
Pressed Brick, $45.00 per M.
Enameled Brick, $65.00 per M.
Red Roofing Tile, $12.00 and $15.00 per square (not laid).
White Cement, $6.00 per bbl.
Portland Cement, $2.30 per bbl.
Lime, $1.50 to $1.75 per bbl.
Hardwall Plaster, per ton, $9.90 ex. whse.
Oregon Pine, Rough Common, 1 x 3 up, $17.00 to $19.00 per M.
Oregon Pine, Rough Common, 2 x 3 up, $17.00 to $21.00 per M.
Oregon Pine Flooring, 1 x 4, No. 1, $40.00; No. 2, $35.00; No. 3, $22.50 per M.
Oregon Pine Ceiling, 1 x 4, No. 1, $36.00; No. 2, $31.00.
Redwood, Rough Common, $20.00 to $24.00.
Redwood Rustic, No. 1, $38.00; No. 2, $33.00 per M.
Redwood Ceiling, 1 x 4, No. 1, $33.00; No. 2, $28.00 per M.
Redwood Shingles, 4 bdls. to M, No. 1, $2.25; No. 2, $1.75.
Red Cedar Shingles, 4 bdls. to M, Star-A-Star, $2.75.
Pine Lath, 1½ in. x 4 ft., $3.25 per M; 1⅝ in. x 4 ft., $3.65 per M.
White Lead in Oil, 8½c per lb.
Red Lead, dry, 8½c per lb.
Raw Linseed Oil, bbls., 63c gallon.
Boiled Linseed Oil, bbls., 65c gallon.
Turpentine, bbls., 63 to 70c. gallon.
Crushed Rock and Gravel, $1.65 per yard.
Sand, 85c per yard.

SACRAMENTO PRICES

Common Brick, $7.00 per M, C/L.
Pressed Brick, Wire Cut, $30.00 per M, C/L.
Portland Cement, $2.40 per bbl. carloads.
Crushed Rock and Gravel, 65c per ton, ex. cars.
Sand, $1.00 yd. on cars.
Roofing Gravel, $1.50 per ton.
Lime, $1.35 bbl.
Hardwall Plaster, $11.40 per ton, ex. whse.

STOCKTON PRICES

Common Brick, $7.75 per M, del.
Face Brick, Wire Cut, $31.00 per M C/L.
Cement, $2.40 per bbl., C/L.
Crushed Rock and Gravel, 90c ton.
Sand, 90c.
Roofing Gravel, $1.50 per ton.
Lime, $1.35.
Hardwall Plaster, $11.40 ex. whse. per ton.

FRESNO PRICES

Common Brick, $9.50 per M, del.
Face Brick, Wire Cut, $35.00 per M, C/L.
Cement, $2.84 per bbl., C/L.
Crushed Rock and Gravel, $1.35 per ton.
Sand, $1.35 per ton.
Roofing Gravel, $1.85 per ton.
Lime, $1.50 bbl.
Hardwall Plaster, $12.40 per ton, ex. whse.

BAKERSFIELD PRICES

Common Brick, $9.50 per M, del.
Face Brick, Wire Cut, $37.00 per M, C/L.
Cement, $2.77 per bbl., C/L.
Crushed Rock and Gravel, $1.80 per ton.
Sand, $1.80 per ton.
Roofing Gravel, $2.00 per ton.
Lime, $1.50 per bbl.
Hardwall Plaster, $13.40 per ton, ex. whse.

CHICO PRICES

Common Brick, $11.00 per M, del.
Face Brick, Wire Cut, $35.00 per M, C/L.
Cement, $2.65 per bbl.
Crushed Rock and Gravel, 85 to 90c per ton, C/L.
Sand, $1.00 per yard.
Roofing Gravel, $1.50 per ton.
Lime, $1.40 bbl.
Hardwall Plaster,—

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Macadam a Poor Road Pavement

The abandonment of macadam as a road pavement is recommended by William Elbring, highway engineer of St. Louis county, Mo., according to newspaper versions of his recent annual report. Mr. Elbring states that rapidly increasing traffic has made various forms of macadam road construction inadequate and urges the construction of permanent pavements of brick or concrete costing from $15,000 to $20,000 per mile. The report shows that $372,161 was expended on maintenance during the past year, an increase of nearly $12,000 over the previous year.

Hollow Tile Residence

The Richards-Neustadt Construction Company, 705 Wright & Callendar building, Los Angeles, is preparing plans and will erect a two-story and basement residence at Pasadena for Mrs. E. M. Neustadt. It will be of hollow tile.

WARNING

The Reliance Ball Bearing Door Hanger Co. is owner of Letter Patents of the United States No. 756,-321, dated April 5, 1914, for Elevator Doors.

2....This patent covers all two speed doors in which the two doors are hung from separate tracks and are operated through a rack bar secured to one of the doors, a stationary rack, and a pinion carried by the other door and in mesh with the two rack bars.

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Business Is Good

While the T. H. Meek Co cannot report that business is booming, they say that they are at present doing quite a lot of high-class work, both in and out of town, and are doing a satisfactory business in spite of the dull times the country has been passing through. This is probably due to their superior workmanship and the fact that they do not insist on "war prices." They recently furnished two out-of-town bank interiors, all in hardwood, and are now rushing work on their Bank of Italy contract, under which they supply and install all the hardwood trim and cabinet work on the new addition to the present banking quarters of this well-known San Francisco banking institution.

They have also just completed unique and elaborate fittings and fixtures in highly figured genisero for the buffet and bar of Mr. Donovan, corner Geary and Van Ness avenue, costing $2,500; also fine mahogany trim and fixtures for bar of Mr. Donahoe, corner Geary and Fillmore streets, in the new building designed by Reid Bros.

Other recent contracts are the following:

Bachelor Inn.

De la Montagne's new offices.

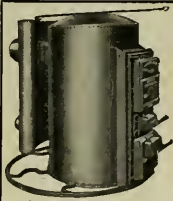
Pearson-Maxwell Automobile Branch offices.

Wiltshire Hotel.

Hardwood trim and bar in extensions for buffet and bar, corner of Ellis and Powell, in Golden West Hotel.

Also show cases and booths for a number of Fair exhibits, in which T. H. Meek & Co. now specialize.

They have, also, started in their factory a new branch for the manufacture of billiard and pocket billiard tables. Their "Superior" cushions have no equal, and their tables are high-class at economical prices.



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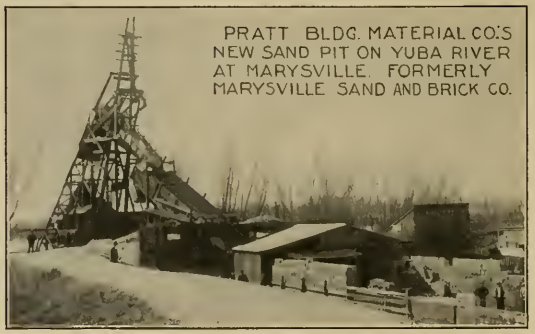
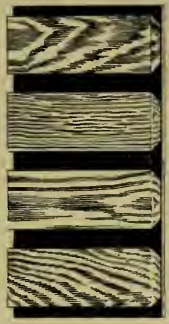
The **Pratt Building Material Co.**, C. F. Pratt, President, ship sand, rock and gravel from fifteen points in ten California counties. Their main office is in the Hearst Building, San Francisco.



The ONLY Background that holds Exterior Plaster Permanently and Prevents Cracking



This shows the construction of stucco or plaster board—Dovetail Lath—damp proof mastic-fiber board.

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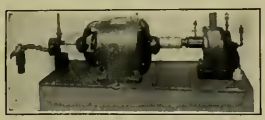

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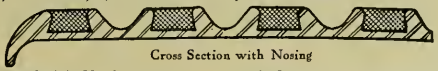

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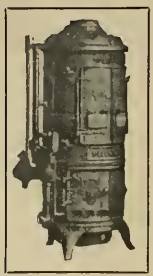

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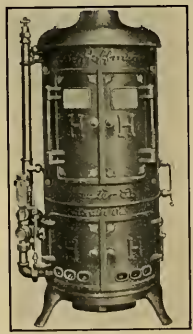

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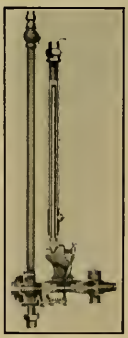

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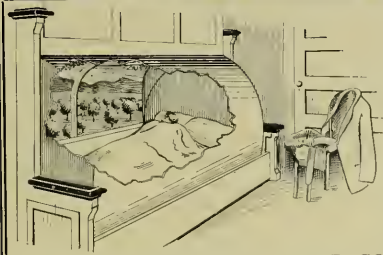

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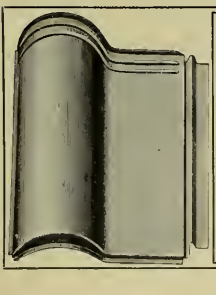

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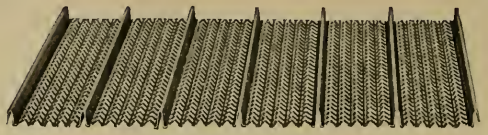

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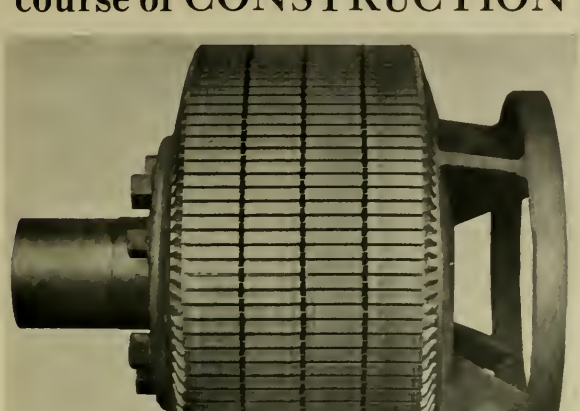

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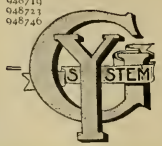

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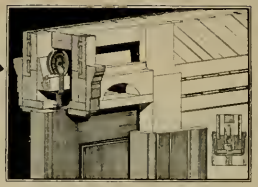

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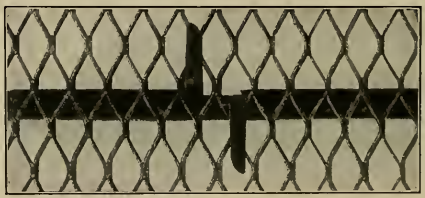

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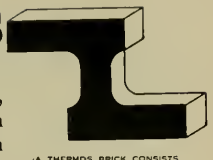

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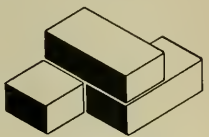

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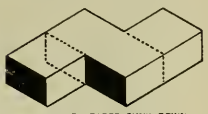

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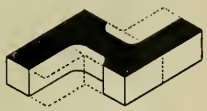

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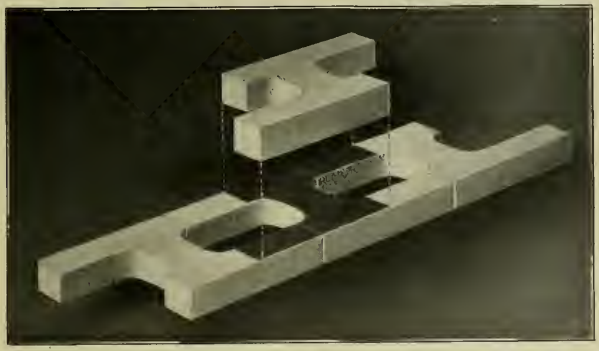

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ARCHITECTS' SPECIFICATION INDEX

(For Index to Advertisements, see next page)

AMERICAN INGOT IRON
American Rolling Mill Co., Middletown, Ohio.
California Corrugated Culvert Co., West Berkeley, Cal.

ARCHITECTURAL SCULPTORS, MODELING, ETC.
O. S. Sarsi, 123 Oak St., San Francisco.
Florentine Art Studio, 932 Vallejo St., San Francisco.
G. Rognier & Co., 233 R. R. Ave., San Mateo.
The Schoenfeld Marble Co., 265 Shipley St., San Francisco.
Western Sculptors, 533-535 Turk St., San Francisco.

ARCHITECTURAL TERRA COTTA
Gladding, McBean & Company, Crocker Bldg., San Francisco.
Steiger Terra Cotta and Pottery Works, Mills Bldg., San Francisco.
Independent Sewer Pipe & Terra Cotta Co., 235 S. Los Angeles St., Los Angeles.

ART GLASS
Sylvain Le Deit, 124 Lenzen Ave., San Jose.

AUTOMATIC SPRINKLERS
Scott Company, 243 Minna St., San Francisco
Pacific Fire Extinguisher Co., 307 Montgomery St., San Francisco.

BANK FIXTURES AND INTERIORS
A. J. Forbes & Son, 1530 Filbert St., San Francisco.
Fink & Schindler, 218 13th St., San Francisco.
C. F. Weber & Co., 365 Market St., San Francisco.
T. H. Meek Co., 1157 Mission St., San Francisco.
M. G. West Co., 353 Market St., San Francisco.
Home Mfg. Co., 543 Brannan St., San Francisco.

BELTING, PACKING, ETC.
H. N. Cook Belting Co., 317-319 Howard St., San Francisco.

BELLS—TOWER, ETC.
McShane Bell Foundry Co., 461 Market St., San Francisco.

BLACKBOARDS
C. F. Weber & Co., 365 Market St., San Francisco.

BONDS FOR CONTRACTORS
Fidelity & Deposit Company of Maryland, Insurance Exchange Bldg., San Francisco.
Globe Indemnity Co., Insurance Exchange Bldg., San Francisco.
Levensaler-Speir Corporation, Monadnock Bldg., San Francisco.
Massachusetts Bonding & Insurance Company, First National Bank Bldg., San Francisco.

BONDS FOR CONTRACTORS—Continued.
Pacific Coast Casualty Co., 416 Montgomery St., San Francisco.
H. Y. MacMeans & Co., 341 Monadnock Bldg., San Francisco.

BRICK—PRESSED, PAVING, ETC.
California Paving Brick Co., Phelan Bldg., San Francisco.
Diamond Brick Co., Balboa Bldg., San Francisco.
Gladding, McBean & Company, Crocker Bldg., San Francisco.
Los Angeles Pressed Brick Co., Frost Bldg., Los Angeles.
Livermore Fire Brick Co., Livermore, Cal.
Pratt Building Material Co., Hearst Bldg., San Francisco.
Steiger Terra Cotta & Pottery Works, Mills Bldg., San Francisco.
Thermos Brick Co., Monadnock Bldg., San Francisco.
United Materials Co., Crossley Bldg., San Francisco.

BRICK AND CEMENT COATING
Wadsworth, Howland & Co., Inc. (See Adv. for Pacific Coast Agents.)
Biturine Company of America, 24 California St., San Francisco.
Trus-Con Par-Seal, made by Trussed Concrete Steel Co. (See Adv. for Pacific Coast Agents.)
Glidden Products, sold by Whittier-Coburn Co., Howard and Beale Sts., San Francisco, and Tibbetts-Oldfield Co., 908 Swain St., Los Angeles.

BRICK STAINS
Samuel Cabot Mfg. Co., Boston, Mass., agencies in San Francisco, Oakland, Los Angeles, Portland, Tacoma and Spokane.

BUILDERS' HARDWARE
Russell & Erwin Mfg. Co., Commercial Bldg., San Francisco.
Vonnegut Hardware Co., Indianapolis. (See Adv. for Coast agencies.)
Western Brass Mfg. Co., 217 Tehama St., S. F.

BUILDING MATERIAL, SUPPLIES, ETC.
Pacific Building Materials Co., 523 Market St., San Francisco.
C. Jorgensen & Co., 356 Market St., S. F.
Western Builders' Supply Co., 155 New Montgomery St., San Francisco.
Biturine Company of America, 24 California St., San Francisco.
C. Roman, 173 Jessie St., San Francisco.
C. F. Pratt Building Material Co., Hearst Bldg., San Francisco.

CAEN STONE
A. Knowles, 985 Folsom St., San Francisco.

All Grades of GRAVEL for CONCRETE AND ROAD WORK

Clean Fresh Water Gravel from Pleasanton—Healdsburg Roofing Gravel

Phone Sutter 1582

A few jobs on which our material was used: Temporary City Hall, Masonic Temple, Stanford Apartments, Sixteenth Street Station at Oakland, St. Luke's Hospital, Lowell High School and hundreds of other first-class buildings. Accepted on all City, State and United States Government work.

GRANT GRAVEL CO. FLATIRON BUILDING, SAN FRANCISCO At Market, Sutter and Sansome Streets

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H.L. PETERSEN **Reinforced Concrete Construction**

Artificial Stone Sidewalks, Concrete Walls, Foundations, Tanks, Reservoirs, Etc., Etc.

Rooms 322-324, 62 POST STREET **SAN FRANCISCO, CAL.**

CEMENT

Atlas Portland Cement Co., represented by United Materials Co., Balboa Bldg., San Francisco.
Mt. Diablo, sold by Henry Cowell Lime & Cement Co., 9 Main St., San Francisco.
"Golden Gate," manufactured by Pacific Portland Cement Co., Pacific Bldg., San Francisco.
Medusa White Portland Cement, sold by Building Material Co., Inc., Monadnock Bldg., San Francisco.

CEMENT EXTERIOR WATERPROOF COATING

Bay State Brick and Cement Coating, made by Wadsworth, Howland & Co. (See distributing Agents on page 32.)
Biturine Co., of America, 24 California St., San Francisco.
Liquid Stone Paint Co., Nevada Bank Bldg., San Francisco.
Concrete Cement Coating, manufactured by the Muralo Company. (See full-page advertisement, color insert.)
Imperial Waterproofing, manufactured by Imperial Co., 183 Stevenson St., San Francisco.
Trus-Con Par-Seal, made by Trussed Concrete Steel Co. (See Adv. for Coast agencies.)
Glidden's Liquid Cement and Liquid Cement Enamel, sold on Pacific Coast by Whittier, Coburn Company, San Francisco, and Tibbetts-Oldfield Co., Los Angeles.

CEMENT EXTERIOR FINISH

Biturine Company of America, 24 California St., San Francisco.
Bay State Brick and Cement Coating, made by Wadsworth, Howland & Co. (See list of Distributing Agents on page 31.)
Glidden"s Liquid Cement and Liquid Cement Enamel, sold on Pacific Coast by Whittier Coburn Co., San Francisco, and Tibbetts-Oldfield Co., Los Angeles.
Liquid Stone Paint Co., Nevada Bank Bldg., San Francisco.
Medusa White Portland Cement, California Agents, the Building Material Co., Inc., 587 Monadnock Bldg., San Francisco.
Concrete Cement Coating, manufactured by the Muralo Company. (See afull-page advertment, color insert.)
Samuel Cabot Mfg. Co., Boston, Mass., agencies in San Francisco, Oakland, Los Angeles, Portland, Tacoma and Spokane.

CEMENT FLOOR COATING

Bay State Brick and Cement Coating, made by Wadsworth, Howland & Co. (See list of Distributing Agents on page 31.)
Glidden's Concrete Floor Dressing, sold on Pacific Coast by Whittier, Coburn Company, San Francisco, and Tibbetts-Oldfield Co., Los Angeles.
Heath & Milligan Mfg. Co., 7-15 Fremont St., San Francisco.
Moller & Schumann Co., Hilo Varnishes, 1022 Mission St., San Francisco.

CEMENT TESTS—CHEMICAL ENGINEERS

Robert W. Hunt & Co., 251 Kearny St., San Francisco.

CHURCH INTERIORS

Fink & Schindler, 218 13th St., San Francisco.

CHUTES—GRAVITY SPIRAL

Gravity Spiral Chutes by Minnesota Manufacturers' Association. G. E. Sturgis, Agt., 602 Mission St., San Francisco.

COLD STORAGE PLANTS

Vulcan Iron Works, San Francisco.
T. P. Jarvis Crude Oil Burning Co., 275 Connecticut St., San Francisco.

CLOCKS—TOWER

Standard Electric Time Co., 461 Market St., San Francisco.
Decker Electrical Construction Co., 111 New Montgomery St., San Francisco.

COMPOSITION FLOORING

Fiberstone & Roofing Co., 971 Howard St., San Francisco.
Lithoid Products Co., Merchants Exchange Bldg., San Francisco.

COMPRESSED AIR CLEANERS

Excello Stationary Vacuum Cleaner, F. W. Schaer Co., Pacific Coast Agts., Santa Maria Bldg., San Francisco.
Tuec., mfrd. by United Electric Company, Coast Branch, General Contractors' Association, San Francisco.
Giant Stationary Suction Cleaner, San Francisco and Oakland.

CONCRETE CONSTRUCTION

American Concrete Co., Humboldt Bank Bldg., San Francisco.
Clinton Fireproofing Co., Mutual Bank Bldg., San Francisco.
McKibben & Taylor, 2125 Shattuck Ave., Berkeley.
Otto, W. H., 269 Park Ave., San Jose.
Barrett & Hilp, Sharon Bldg., San Francisco.
Foster, Vogt Co., Sharon Bldg., San Francisco.
P. A. Palmer, Monadnock Bldg., San Francisco.
Petersen, H. L., 62 Post St., San Francisco.
A. Lynch, 185 Stevenson St., San Francisco.
Ransome Concrete Co., Oakland and Sacramento.
F. J. R. Rickon, 1859 Geary St., San Francisco.

CONCRETE MIXERS

Austin Improved Cube Mixer. Factory branch, temporary office, 1235 Pine St., San Francisco.
Foote Mixers sold by Edw. R. Bacon, 40 Natoma St., San Francisco.
Koehring Mixer, sold by Harron, Rickard & McCone, San Francisco.
Smith Mixers, sold by Parrott & Co., San Francisco and Los Angeles.

CONCRETE POURING APPARATUS

Concrete Appliances Co., Los Angeles; Parrott & Co., Coast Representatives, San Francisco, Portland, Seattle.

Specify... **For Plastering**

HOLMES DIAMOND SANTA CRUZ LIME

PHONE SUTTER 2202

Holmes Lime & Cement Co.

Guaranteed Against Pitting or Popping

600 Postal Telegraph Bldg., San Francisco

ARCHITECTS' SPECIFICATION INDEX—*Continued*

CONCRETE REINFORCEMENT

United States Steel Products Co., San Francisco, Los Angeles, Portland and Seattle.
Clinton Welded Reinforcing System, L. A. Norris, Monadnock Bldg., San Francisco.
"Kahn System," see advertisement on page 158, this issue.
International Fabric & Cable, represented by Western Builders' Supply Co., 155 New Montgomery St., San Francisco.
Triangle Mesh Fabric. Sales Agents, Pacific Building Materials Co., 523 Market St., San Francisco.
Twisted Bars, sold by Woods & Huddart, 444 Market St., San Francisco.

CONCRETE SURFACING

"Biturine," sold by Biturine Co. of America, 24 California St., San Francisco.
"Concreta" sold by W. P. Fuller & Co., San Francisco.
Wadsworth, Howland & Co.'s Bay State Brick and Cement Coating, sold by R. N. Nason & Co., San Francisco and Los Angeles.
Liquid Stone Paint Co., Nevada Bank Bldg., San Francisco.
Glidden Liquid Cement, manufactured by Glidden Varnish Co., Whittier, Coburn Co., San Francisco, and Tibbetts-Oldfield Co., Los Angeles.
Goheen Mfg. Co., Canton O., C. W. Coburn & Co., 320 Market St., San Francisco, and A. J. Capron, Ainsworth Bldg., Portland, Oregon.
Moller & Schumann, 1023 Mission St., San Francisco.

CONTRACTORS, GENERAL

American Concrete Co., Humboldt Bank Bldg., San Francisco.
Foster, Vogt Co., Sharon Bldg., San Francisco.
M. Fisher, California-Pacific Bldg., San Francisco.
Herman T. Ludwig, 24 California St., San Francisco.
Howard S. Williams, Hearst Bldg., San Francisco.
Graham & Jensen, Maskey Bldg., San Francisco.
Monson Bros., 1907 Bryant St., San Francisco.
Ransome Concrete Co., 1218 Broadway, Oakland.
F. J. Rickon, C. E., 1859 Geary St., San Francisco.
Williams Bros. & Henderson, Holbrook Bldg., San Francisco.
Burt T. Owsley, 311 Sharon Bldg., San Francisco.
Arthur W. Biggers, 112 Market St., San Francisco.
Sonnd Construction Co., Hearst Building, San Francisco.
Barrett & Hilp, Sharon Bldg., San Francisco.

CORNER BAR

Dolbear Curb Bar, manufactured by American Steel Bar Co., 1034 Merchants Exchange Bldg., San Francisco.
Wainwright Steel Corner Bar, made by Steel Protected Concrete Co., Philadelphia, Pa.

CORNER BEAD

Union Metal Corner Bead, sold by Pacific Building Materials Co., Underwood Bldg., San Francisco.
United States Metal Products Co., 525 Market St., San Francisco.; 750 Keller St., San Francisco.

CRUSHED ROCK

Grant Gravel Co., Flat Iron Bldg., San Francisco.
Niles Rock, sold by California Building Material Company, Pacific Bldg., San Francisco.
Niles Sand, Gravel & Rock Co., Mutual Bank Bldg., San Francisco.

DAMP-PROOFING COMPOUND

Biturine Co. of America, 24 California St., San Francisco.
Glidden's Liquid Rubber, sold on Pacific Coast by Whittier, Coburn Company, San Francisco, and Tibbetts-Oldfield Co., Los Angeles.
Imperial Co., 183 Stevenson St., San Francisco.
Lithoid Product Co., Merchants Exchange Bldg., San Francisco.
Trus-Con Damp Proofing. (See advertisement of Trussed Concrete Steel Company for Coast agencies.)
"Paheo" Damp Proofing Compound, sold by Paraffine Paint Co., 34 First St., San Francisco.
Liquid Stone Paint Co., Hearst Bldg., San Francisco.
Wadsworth, Howland & Co., Inc., 84 Washington St., Boston. (See Adv. for Coast agencies.)

DOOR HANGERS

McCabe Hanger Mfg. Co., New York, N. Y.
Pitcher Hanger, sold by National Lumber Co., Fifth and Bryant Sts., San Francisco.
Reliance Hanger, sold by Sartorius Co., San Francisco; D. F. Fryer & Co., Louis R. Bedell, Los Angeles, and Portland Wire & Iron Works.

DRINKING FOUNTAINS

Haws Sanitary Fountain, 1808 Harmon St., Berkeley, and C. F. Weber & Co., San Francisco and Los Angeles.
N. O. Nelson Mfg. Co., 978 Howard St., San Francisco.
Crane Company, San Francisco, Oakland, and Los Angeles.

DUMB WAITERS

Spencer Elevator Company, 173 Beale St., San Francisco.
Burdett-Rowntree Mfg. Co., Underwood Bldg., San Francisco.

ELECTRICAL CONTRACTORS

Butte Engineering Co., 683 Howard St., San Francisco.
Central Electric Co., 185 Stevenson St., San Francisco.
Scott Co., Inc., 243 Minna St., San Francisco.
Pacific Fire Extinguisher Co., 507 Montgomery St., San Francisco.

ELECTRICAL ENGINEERS

Albert E. Noble, 173 Jessie St., San Francisco.
Chas. T. Phillips, Pacific Bldg., San Francisco.

ELECTRIC PLATE WARMER

The Prometheus Electric Plate Warmer for residences, clubs, hotels, etc. Sold by M. E. Hammond, Humboldt Bank Bldg., San Francisco.

MORTENSON CONSTRUCTION CO.

CONTRACTORS FOR STRUCTURAL STEEL AND IRON

H. MORTENSON, Pres. CHAS. G. MORTENSON, Vice-Pres. and Mgr.

OFFICE AND SHOPS: CORNER 19TH AND INDIANA STREETS

PHONES: Mission 5033—Home M 3916 SAN FRANCISCO, CAL.

"FIBRESTONE"

SANITARY FLOORING, WAINSCOT AND BASE. **Laid Exclusively by**
FIBRESTONE & ROOFING CO., 971 Howard St. San Francisco Tel. Sutter 329

ARCHITECTS' SPECIFICATION INDEX—*Continued*

ELEVATORS
- Otis Elevator Company, Stockton and North Point, San Francisco.
- Spencer Elevator Company, 126 Beale St., San Francisco.
- San Francisco Elevator Co., 860 Folsom St., San Francisco.
- Pacific Gurney Elevator Co., 186 Fifth St., San Francisco.
- Van Emon Elevator Co., Natoma St., San Francisco.

ELEVATORS, SIGNALS, FLASHLIGHTS AND DIAL INDICATORS
- Elevator Supply & Repair Co., Underwood Bldg., San Francisco

ENGINEERS
- F. J. Amweg, 700 Marston Bldg., San Francisco.
- W. W. Breite, Clunie Bldg., San Francisco.
- L. M. Hausmann, Sharon Bldg., San Francisco.
- Chas. T. Phillips, Pacific Bldg., San Francisco.
- Hunter & Hudson, Rialto Bldg., San Francisco.

EXIT DEVICES
- Von Duprin Self-Releasing Fire Exit Devices, manufactured by Vonnegut Hardware Co. (See Adv. for Coast Distributors.)

EXPRESS CALL SYSTEM
- Elevator Supply & Repair Co., Underwood Bldg., San Francisco.

FIRE EXIT DEVICES
- Von Duprin Self-Releasing Fire Exit Devices, Vonnegut Hardware Co. (See Adv. for Coast Agencies.)

FIRE ESCAPES
- Pacific Structural Iron Works, Structural Iron and Steel, Fire Escapes, etc. Phone Market 1374; Home J. 3435. 370-84 Tenth St., San Francisco.
- Western Iron Works, 141 Beale St., San Francisco.

FIRE EXTINGUISHERS
- Scott Company, 243 Minna St., San Francisco.
- Pacific Fire Extinguisher Co., 507 Montgomery St., San Francisco.
- Levensaler-Spier Corporation, Monadnock Bldg., San Francisco.

FIRE BRICK
- Livermore Fire Brick Co., Livermore, Cal.

FIREPLACE DAMPER
- Head, Throat and Damper for open fireplaces, Colonial Fireplace Co., Chicago. (See advertisement for Coast agencies.)

FIREPROOFING AND PARTITIONS
- Gladding, McBean & Co., Crocker Bldg., San Francisco.
- Los Angeles Pressed Brick Co., Frost Bldg., Los Angeles.
- The Jackson Fireproof Partition Co., Levensaler-Spier Corporation, Distributors, Monadnock Bldg., San Francisco.

FIREPROOF PAINT
- Liquid Stone Paint Co., Nevada Bank Bldg., San Francisco.
- Glidden Products, sold by Whittier-Coburn Co., San Francisco, and Tibbetts-Oldfield Co., Los Angeles.

FIXTURES—BANK, OFFICE, STORE, ETC.
- A. J. Forbes & Son, 1530 Filbert St., San Francisco.
- Fink & Schindler, 218 13th St., San Francisco.
- C. F. Weber & Co., 365 Market St., San Francisco and 210 N. Main St., Los Angeles, Cal.
- T. H. Meek Co., 1157 Mission St., San Francisco.

FLOOR VARNISH
- Bass-Hueter and San Francisco Pioneer Varnish Works, 816 Mission St., San Francisco.
- R. N. Nason & Co., 151 Potrero Ave., San Francisco.
- Standard Varnish Works, Chicago, New York and San Francisco.
- Moller & Schumann Co., 1022 Mission St., San Francisco.
- Glidden Products, sold by Whittier-Coburn Co., San Francisco, and Tibbetts-Oldfield Co., Los Angeles.

FLOORING—MAGNESITE
- Fibrestone & Roofing Co., 971 Howard St., San Francisco.

FLUMES
- California Corrugated Culvert Co., West Berkeley, Cal.

GARAGE EQUIPMENT
- Bowser Gasoline Tanks and Outfit, Bowser & Co., 612 Howard St., San Francisco.

GAS GENERATORS
- Utility Gas Generator Co., 340 Sansome St., San Francisco.

GLASS
- W. P. Fuller & Company, all principal Coast cities.
- Whittier-Coburn Co., Howard & Beale Sts., San Francisco.

GRANITE
- California Granite Co., Sharon Bldg., San Francisco.

GRAVEL, SAND AND CRUSHED ROCK
- Bay Development Co., 153 Berry St., San Francisco
- California Building Material Co., Pacific Bldg., San Francisco.
- Del Monte White Sand, sold by Pacific Improvement Co., Crocker Bldg., San Francisco.
- Pratt Building Material Co., Hearst Bldg., San Francisco.
- Grant Gravel Co., Flatiron Bldg., San Francisco.
- Niles Sand, Rock & Gravel Co., 971 Howard St., San Francisco.

"White-Steel" Medicine Cabinets and Mirrors are the last word in Sanitary Bathroom Equipment. See Sweet's 1914 Catalog, Pages 1054-1055 or write for full information.

"WHITE-STEEL" SANITARY FURNITURE CO.
Grand Rapids, Michigan

Northern California
Johnson-Locke Mercantile Co.
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Southern California
H. R. Boynton Company
Los Angeles, Calif.

CLARENCE E. MUSTO. Pres. JOSEPH B. KEENAN. Vice-Pres. GUIDO J. MUSTO. Sec'y & Treas.

JOSEPH MUSTO SONS-KEENAN CO.

Phone Franklin —6365— **MARBLE**

OFFICE AND MILLS: 535-565 North Point St., SAN FRANCISCO, CAL.

ARCHITECTS' SPECIFICATION INDEX—*Continued*

HARDWALL PLASTER
Henry Cowell Lime & Cement Co., San Francisco.
American Keene Cement Co., 333 Monadnock Bldg., San Francisco.

HARDWARE
Russwin Hardware, Joost Bros., San Francisco.
Western Brass Mfg. Co., 217 Tehama St., S. F.

HARDWOOD FLOORING
Parrott & Co., 320 California St., San Francisco
White Bros., Cor. Fifth and Brannan Sts., San Francisco.
Hardwood Interior Co., 554 Bryant St., San Francisco.

HARDWOOD LUMBER
Dieckmann Hardwood Co., Beach and Taylor Sts., San Francisco.
Parrott & Co., 320 California St., San Francisco.
White Bros., Cor. Fifth and Brannan Sts., San Francisco.

HEATERS—AUTOMATIC
Pittsburg Water Heater Co., 237 Powell St., San Francisco.
Hoffman Heaters, factory branch, 397 Sutter St., San Francisco.

HEATING EQUIPMENT—VACUUM, ETC.
Edward Stephenson, 618 Monadnock Bldg., San Francisco.

HEATING AND VENTILATING
American Heat & Power Co., Oakland, Cal.
J. M. Boscus, 975 Howard St., San Francisco.
Fess System Co., 220 Natoma St., San Francisco.
Mangrum & Otter, Inc., 507 Mission St., San Francisco.
Scott Company, 243 Minna St., San Francisco.
Wittman, Lyman & Co., 341 Minna St., San Francisco.
Pacific Fire Extinguisher Co., 507 Montgomery St., San Francisco.
Petersen-James Co., 710 Larkin St., San Francisco.

HOLLOW BLOCKS
Denison Hollow Interlocking Blocks, 310 Ochsner Bldg., Sacramento, and Chamber of Commerce Bldg., Portland.

INGOT IRON, SHEETS, PLATES, ETC.
American Rolling Mill Co., Middleton, Ohio.
California Corrugated Culvert Co.,, 5th and Parker Sts., West Berkeley.

INSPECTIONS AND TESTS
Robert W. Hunt & Co., 251 Kearny St., San Francisco.

IRRIGATION GATES, SUPPLIES, ETC.
California Corrugated Culvert Co., West Berkeley, Cal.

IRON PAINT
Gobeen Mfg. Company, Canton, Ohio.

JOIST HANGERS
Western Builders' Supply Co., 155 New Montgomery St., San Francisco.

KEENE CEMENT
American Keene Cement Co., Monadnock Bldg., San Francisco.

LIME
Holmes Lime and Cement Co., Postal Telegraph Bldg., San Francisco.
Henry Cowell Lime & Cement Co., 9 Main St., San Francisco.

LIGHT, HEAT AND POWER
Pacific Gas & Elec. Co., 445 Sutter St., San Francisco.

LUMBER
Dudfield Lumber Co., Palo Alto, Cal.
Sunset Lumber Co., Oakland, Cal.
Santa Fe Lumber Co., Seventeenth and De Haro Sts., San Francisco.

MAIL CHUTES
Cutler Mail Chute Co., Rochester, N. Y. (See Adv. on page 38 for Coast representatives.)

MANTELS
Mangrum & Otter, 561 Mission St., San Francisco.

MARBLE
Columbia Marble Co., 268 Market St., San Francisco.
Joseph Musto Sons-Keenan Co., 535 North Point St., San Francisco.

MEDICINE CABINETS
White Steel Sanitary Furniture Co., rep. by Johnson-Locke Mercantile Co., San Francisco.

METAL AND STEEL LATH
Jackson Fireproof Partition Co., Levensaler-Spiet Corporation, distributors, Monadnock Bldg., San Francisco.
L. A. Norris & Co., Monadnock Bldg., San Francisco.
Pratt Building Material Co., Hearst Bldg., San Francisco.

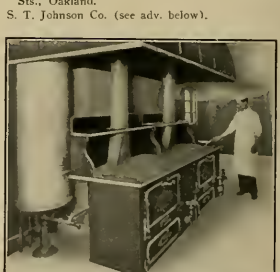
METAL CEILINGS
San Francisco Metal Stamping & Corrugating Co., 2269 Folsom St., San Francisco.

METAL DOORS AND WINDOWS
U. S. Metal Products Co., 525 Market St., San Francisco.
Dahlstrom Metallic Door Co., Western office, with M. G. West Co., 353 Market St., San Francisco.

METAL FURNITURE
M. G. West Co., 353 Market St., San Francisco.
Chas. M. Finch, 311 Board of Trade Bldg., San Francisco.

METAL SHINGLES
Meurer Bros., 630 Third St., San Francisco.
San Francisco Metal Stamping & Corrugating Co., 2269 Folsom St., San Francisco.

OIL BURNERS
American Heat & Power Co., Seventh and Cedar Sts., Oakland.
S. T. Johnson Co. (see adv. below).



Crude Oil Burners Operating Kitchen Ranges in Government Barracks at Fort Winfield Scott

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Modern EQUIPMENTS for Cooking and Heating Plants
S. T. JOHNSON CO.
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126-128 BEALE STREET
TELEPHONE KEARNY 664 SAN FRANCISCO

ARCHITECTS' SPECIFICATION INDEX—*Continued*

OIL BURNERS—Continued.
Fess System Co., 220 Natoma St., San Francisco.
T. P. Jarvis Crude Oil Burner Co., 275 Connecticut St., San Francisco.

ORNAMENTAL IRON AND BRONZE
Brode Iron Works, 31-37 Hawthorne St., San Francisco.
California Artistic Metal & Wire Co., 349 Seventh St., San Francisco.
J. G. Braun, Chicago and New York.
Kalston Iron Works, 20th and Indiana Sts., San Francisco.
Monarch Iron Works, 1165 Howard St., San Francisco.
C. J. Hillard Company, Inc., 19th and Minnesota Sts., San Francisco.
Shreiber & Sons Co., represented by Western Builders Supply Co., San Francisco.
West Coast Wire & Iron Works, 861-863 Howard St., San Francisco.
Vulcan Iron Works, San Francisco.

PAINTING AND DECORATING
D. Zelinsky, 564 Eddy St., San Francisco.
Horace W. Tyrell, 1707 38th Ave., Oakland.
Robert Swan, 1133 E. 12th St., Oakland.

PAINT FOR BRIDGES
Biturine Company of America, 24 California St., San Francisco.

PAINT FOR STEEL STRUCTURES
"Biturine," sold by Biturine Co. of America, 24 California St., San Francisco.
Carbonizing Coating, made by Goheen Mfg. Co., Canton, Ohio.
Trus-Con Bar-Ox, Trussed Concrete Steel Co. (See Adv. for Coast agencies.)
Glidden's Acid Proof Coating, sold on Pacific Coast by Whittier, Coburn Company, San Francisco, and Tibbetts-Oldfield Co., Los Angeles.

PAINT FOR CEMENT
Bay State Brick and Cement Coating, made by Wadsworth, Howland & Co. (Inc.). (See Adv. in this issue for Pacific Coast agents.)
"Biturine," sold by Biturine Co. of America, 24 California St., San Francisco.
Goheen Mfg. Co., represented by C. W. Coburn & Co., 320 Market St., San Francisco, and A. J. Capron, Ainsworth Bldg., Portland.
Trus-Con Stone Tex, Trussed Concrete Steel Co. (See Adv. for Coast agencies.)
Liquid Stone Paint Co., Nevada Bank Bldg., San Francisco, Los Angeles, and San Diego.
Glidden's Liquid Cement, sold on Pacific Coast by Whittier, Coburn Company, San Francisco and Tibbetts-Oldfield Co., Los Angeles.
Concreto Cement Coating, manufactured by the Muralo company. (See color insert for Coast distributors.)
Moller & Schumann Co., Hilo Varnishes, 1022 Mission St., San Francisco.
Samuel Cabot Mfg. Co., Boston, Mass., agencies in San Francisco, Oakland, Los Angeles, Portland, Tacoma and Spokane.
"Technola," a cement paint, sold by C. Roman, San Francisco.

PAINTS, OILS, ETC.
Concreto Cement Coating, manufactured by the Muralo company. (See color insert for Coast distributors.)
Bass-Heuter Paint Co., Mission, near Fourth St., San Francisco.
Whittier-Coburn Co., Howard and Beale Sts., San Francisco.
"Biturine," sold by Biturine Co. of America, 24 California St., San Francisco.
Heath & Milligan Mfg. Co., 9-15 Fremont St., San Francisco.
Glidden Varnish Co., Cleveland, Ohio, represented by Whittier-Coburn Co., San Francisco and Tibbetts-Oldfield Co., Los Angeles.
Goheen Mfg. Co., Canton, Ohio.
Moller & Schumann Co., 1022 Mission St., San Francisco.
Paraffine Paint Co., 38-40 First St., San Francisco.
W. P. Fuller & Co., all principal Coast cities.
R. N. Nason Co., San Francisco.
Standard Varnish Works, 113 Front St., San Francisco.

PAVING BRICK
California Brick Company, Phelan Bldg., San Francisco.

PHOTO ENGRAVING
California Photo Engraving Co., 121 Second St., San Francisco.

PHOTOGRAPHY
R. J. Waters Co., 717 Market St., San Francisco.

PIPE—CORRUGATED INGOT IRON
California Corrugated Culvert Co., Los Angeles and West Berkeley.

PIPE—VITRIFIED SALT GLAZED TERRA COTTA
Gladding, McBean & Co., Crocker Bldg., San Francisco.
Pacific Sewer Pipe Co., I. W. Hellman Bldg., Los Angeles.
Pratt Building Material Co., Hearst Bldg., San Francisco.
Steiger Terra Cotta and Pottery Works, Mills Bldg., San Francisco.

PLASTER CONTRACTORS
A. Knowles, 985 Folsom St., San Francisco.

PLUMBERS' MARBLE HARDWARE
Western Brass Mfg. Co., 217 Tehama St., S. F.

PLUMBING
Boscus Bros., 975 Howard St., San Francisco.
Scott Co., Inc., 243 Minna St., San Francisco.
Peterson-James Co., 710 Larkin St., San Francisco.
Whitman, Lyman & Co., 341 Minna St., San Francisco.
Alex Coleman, 706 Ellis St., San Francisco.

PLUMBING FIXTURES, MATERIALS, ETC.
Crane Co., Second and Brannan Sts., San Francisco.
N. O. Nelson Mfg. Co., 978 Howard St., San Francisco.
California Steam Plumbing Supply Co., 671 Fifth St., San Francisco.
J. L. Mott Iron Works, D. H. Gulick, selling agent, 135 Kearny St., San Francisco.
Western States Porcelain Co., San Pablo, Cal.

HERE IT IS **MADE IN CALIFORNIA, TOO!**
A High Class Washable Paint for Inside Walls.
OPAQUE FLAT FINISH
Less material required to cover surface than any similar product on the market.
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Sound Construction and Engineering Co.
Incorporated
J. T. WALSH, Engr. and Mgr.
HEARST BUILDING, SAN FRANCISCO, CAL.

ARCHITECTS' SPECIFICATION INDEX—*Continued*

POTTERY
Steiger Terra Cotta and Pottery Works, Mills Bldg., San Francisco.
PULLEYS, SHAFTING, GEARS, ETC.
Meese & Gottfried Co., San Francisco, Seattle, Portland and Los Angeles.
PUMPS
Chicago Pump Company, 612 Howard street, San Francisco.
REFRIGERATORS
McCray Refrigerators, sold by Nathan Dohrmann Co., Geary and Stockton Sts., San Francisco.
Vulcan Iron Works, San Francisco.
REVOLVING DOORS
American Revolving Door Co., 2514 Monroe St., Chicago, Ill.
Van Kennel Doors, sold by U. S. Metal Products Co., 525 Market St., San Francisco.
ROAD DRAINS
California Corrugated Culvert Co., West Berkeley, Cal.
ROLLING DOORS, SHUTTERS, PARTITIONS, ETC.
Pacific Building Materials Co., 523 Market St., San Francisco .
C. F. Weber & Co., 365 Market St., San Francisco.
Union Blind and Ladder Company, manufacturers of the Acme rolling partitions for churches and schools, 3535 Peralta St., Oakland.
Wilson's Steel Rolling Doors, U. S. Metal Products Co., San Francisco and Los Angeles.
ROOFING AND ROOFING MATERIALS
Bitutine Co. of America, 24 California St., San Francisco.
Grant Gravel Co., Flat Iron Bldg., San Francisco.
Fibrestone & Roofing Co., 971 Howard St., San Francisco.
"Ruberoid," manufactured by Paraffine Paint Co., San Francisco.
Mackenzie Roof Co., 425 15th St., Oakland.
United Materials Co., Crossley Bldg., San Francisco.
ROOFING TIN
American Sheet & Tin Plate Co., Pacific Coast representatives, U. S. Steel Products Co., San Francisco, Los Angeles, Portland and Seattle.
Meurer Bros., A. H. MacDonald, agent, 630 Third St., San Francisco.
SAFES, VAULTS, BANK EQUIPMENT
M. G. West Co., 353 Market St., San Francisco.
SAFETY TREADS
American Mason Safety Tread. (See Adv. on page 147 for Coast agents.)
Universal Safety Tread Co., represented by Pacific Building Materials Co., 523 Market St., San Francisco.
SANDSTONE BRICK
Sacramento Sandstone Brick Co., Sacramento, Cal.
SANITARY DRINKING FOUNTAINS
N. O. Nelson Mfg. Co., 978 Howard St., San Francisco.
Haws' Sanitary Drinking Faucet Co., 1808 Harmon St., Berkeley.
SASH CORD
Regal Sash Cord, Louisville Selling Co. represented on Pacific Coast by Baker & Hamilton.
Samson Cordage Works, manufacturers of Solid Braided Cords and Cotton Twines, 88 Broad St., Boston, Mass.
SCENIC PAINTING—DROP CURTAINS, ETC.
The Edwin H. Flagg Scenic Co., 1638 Long Beach Ave., Los Angeles.
SCHOOL FURNITURE AND SUPPLIES
C. F. Weber & Co., 365 Market St., San Francisco; 312 S. Broadway, Los Angeles.
SCULPTORS
Western Sculptors, 533-535 Turk St., San Francisco.
SEWAGE EJECTORS
Chicago Pump Co., represented by Telephone Electric Equipment Co., 612 Howard street, San Francisco.
SHEATHING AND SOUND DEADENING
Samuel Cabot Mfg. Co., Boston, Mass., agencies in San Francisco, Oakland, Los Angeles, Portland, Tacoma and Spokane.
SHEET METAL WORK, SKYLIGHTS, ETC.
Berger Mfg. Co., 1120 Mission St., San Francisco.
U. S. Metal Products Co., 525 Market St., San Francisco.
SHINGLE STAINS
Cabot's Creosote Stains, sold by Waterhouse & Price, San Francisco, Los Angeles and Portland.
STEEL AND IRON—STRUCTURAL
Central Iron Works, 621 Florida St., San Francisco.
Dyer Bros., 17th and Kansas Sts., San Francisco.
Judson Manufacturing Co., 819 Folsom St., San Francisco.
Brode Iron Works, 31 Hawthorne St., San Francisco.
Mortenson Construction Co., 19th and Indiana Sts., San Francisco.
J. L. Mott Iron Works, D. H. Gulick, agents, 135 Kearny St., San Francisco.
Pacific Rolling Mills, 17th and Mississippi Sts., San Francisco.
Pacific Structural Iron Works, Structural Iron and Steel, Fire Escapes, etc. Phone Market 1374; Home, J. 3435, 370-84 Tenth St., San Francisco.
Ralston Iron Works, Twentieth and Indiana Sts., San Francisco.
U. S. Steel Products Co., Rialto Bldg., San Francisco.
Schreiber & Sons Co., represented by Western Builders Supply Co., S. F.
Vulcan Iron Works, San Francisco.

CALIFORNIA ARTISTIC METAL & WIRE CO.
J. T. McCORMICK - President
ORNAMENTAL IRON & BRONZE WORK
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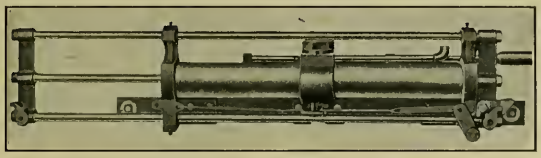
TELEPHONE: MARKET 2162

EVERY TRIP TESTS THE SAFETY INTERLOCK

Every movement of any elevator door tests the Safety Interlock and positively proves that it is in working order. Devices that are tested only under the stress of emergency may fail when they are most needed. The Safety Door Operator and Safety Interlock are always "on the job," and the door is safely closed.

The elevator entrance is tightly closed when the car has left the floor.



Burdett Rowntree Pneumatic Door Operating Device

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Dumbwaiters
Door Operating Devices
Elevator Interlocks

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Elevator Accessories
Norton Door Closers

323 Underwood Building,
525 Market Street
Phone Douglas 2898
San Francisco, - - Cal.

ARCHITECTS' SPECIFICATION INDEX—*Continued*

STEEL AND IRON—STRUCTURAL—(Cont'd)
Western Iron Works, 141 Beale St., San Francisco.
Woods & Huddart, 444 Market St., San Francisco.

STEEL PRESERVATIVES
Biturine Company of America, 24 California St., San Francisco.
Gobeen Mfg. Co., Canton, Ohio, represented by C. W. Coburn & Co., 320 Market St., San Francisco, and A. J. Capron, 17 Ainsworth Bldg., Los Angeles.
Wadsworth, Howland & Co., Boston Mass. (See Adv. for Coast agencies.)

STEEL BARS FOR CONCRETE REINFORCEMENT
Judson Mfg. Co., 819 Eolsom St., San Francisco.
Kahn and Rib Bars, made by Trussed Concrete Steel Co. (See Adv. for Coast agencies.)
Woods & Huddart, 444 Market St., San Francisco.

STEEL MOULDINGS FOR STORE FRONTS
J. G. Braun, 537 W. 35th St., New York, and 615 S. Paulina St., Chicago.

STEEL FIREPROOF WINDOWS
United States Metal Products Co., San Francisco and Los Angeles.

STEEL STUDDING
Collins Steel Partition, Parrott & Co., San Francisco and Los Angeles.
"Lesco," Metal Stud, Levensaler-Speir Corporation, Monadnock Bldg., San Francisco.

STONE
California Granite Co., 518 Sharon Bldg., San Francisco.
Boise Sandstone Co., Boise, Idaho.

STORAGE SYSTEMS
S. F. Bowser & Co., 612 Howard St., San Francisco.

SURETY BONDS
Globe Indemnity Co., Insurance Exchange Bldg., San Francisco.
Massachusetts Bonding & Insurance Co., First National Bank Bldg., San Francisco.
Fidelity & Deposit Co. of Maryland, Mills Bldg., San Francisco.
Pacific Coast Casualty Co., Merchants' Exchange Bldg., San Francisco.

THEATER AND OPERA CHAIRS
C. F. Weber & Co., 365 Market St., San Francisco

TELEPHONE EQUIPMENT
Telephone Electric Equipment Co., 612 Howard St., San Francisco.

TILES, MOSAICS, MANTELS, ETC.
Mangrum & Otter, 561 Mission St., San Francisco.
The Mosaic Tile Co., 230 Eighth St., San Francisco.
John Petrovffsky, 523 Valencia St., San Francisco.

TILE FOR ROOFING
Fibrestone & Roofing Co., 971 Howard St., San Francisco.
Gladding, McBean & Co., Crocker Bldg., San Francisco.
United Materials Co., Crossley Bldg., San Francisco.

TILE WALLS—INTERLOCKING
Denison Hollow Interlocking Blocks, Ochsner Bldg., Sacramento.
Thermos Brick Co., Monadnock Bldg., San Francisco.

TIN PLATES
American Tin Plate Co., Riato Bldg., San Francisco.

VITREOUS CHINAWARE
Western States Porcelain Co., Richmond, Cal.

VACUUM CLEANERS
The Vak-Klean Vacuum Cleaner, Pneulectric Co., Pacific Coast Agts., 943 Phelan Bldg., San Francisco.
Giant Stationary Suction Cleaner, manufactured by Giant Suction Cleaner Co., 731 Folsom St., San Francisco and Third and Jefferson Sts., Oakland.
Invincible Vacuum Cleaner, R. W. Foyle, Agent, San Francisco.
"Excello" Stationary Vacuum Cleaner, F. W. Schaer Co., Pacific Coast agents, Santa Maria Bldg., San Francisco.

VACUUM CLEANERS—Continued
"Tuec" Air Cleaner, manufactured by United Electric Co., 110 Jessie St., San Francisco.
B. & W. Stationary Vacuum Cleaner, sold by Arthur T. Riggs, 510 Claus Spreckels Bldg., San Francisco.

VALVES
Jenkins Bros., 247 Mission St., San Francisco.

VALVE PACKING
"Palmetto Twist," sold by H. N. Cook Belting Co., 317 Howard St., San Francisco.

VARNISHES
W. P. Fuller Co., all principal Coast cities.
Glidden Varnish Co., Cleveland, O., represented on the Pacific Coast by Whittier-Coburn Co., San Francisco, and Tibbetts-Oldfield Co., Los Angeles.
Standard Varnish Works, 113 Front St., San Francisco.
S. F. Pioneer Varnish Works, 816 Mission St., San Francisco.
Moller & Schumann Co., Hilo Varnishes, 1022-24 Mission St., San Francisco.
R. N. Nason & Co., San Francisco and Los Angeles.

VENETIAN BLINDS, AWNINGS, ETC.
C. F. Weber & Co., 365 Market St., San Francisco.

WALL BEDS
Marshall & Stearns Co., 1154 Phelan Bldg., San Francisco.

WALL BOARD
Bishopric Wall Board sold by I. E. Thayer & Co., San Francisco, and Central Door & Lumber Co., Portland, Oregon.
Levensaler-Spier Corporation, Monadnock Bldg., San Francisco.

WALL SAFES
Lowrie Wall Safe, sold by C. Roman Co., 173 Jessie St., San Francisco.

WATER HEATERS
Pittsburg Water Heater Co., 237 Powell St., San Francisco.
Hoffman Heater Co., Sutter St., San Francisco.
Radke Heaters, sold by Schaer Bros., 173 Jessie St., San Francisco.

WATERPROOFING FOR CONCRETE, BRICK, ETC.
Concreto Cement Coating, manufactured by the Muralo Co. (See color insert for Coast distributors.)
Fibrestone & Roofing Co., 971 Howard St., San Francisco.
Glidden's Concrete Floor Dressing and Liquid Cement Enamel, sold on Pacific Coast by Whittier, Coburn Company, San Francisco and Tibbetts-Oldfield Co., Los Angeles.
Imperial Co., 183 Stevenson St., San Francisco.
Liquid Stone Paint Co., Nevada Bank Bldg., San Francisco.
Samuel Cabot Mfg. Co., Boston, Mass., agencies in San Francisco, Oakland, Los Angeles, Portland, Tacoma and Spokane.
The Building Material Co., Inc., 583 Monadnock Bldg., San Francisco.
Wadsworth, Howland & Co., Inc. (See Adv. for Coast agencies.)

WHITE ENAMEL FINISH
"Gold Seal," manufactured and sold by Bass-Hueter Paint Company. All principal Coast cities.
"Satinette," Standard Varnish Works, 113 Front St., San Francisco.
Moller & Schumann Co., Hilo Varnishes, 1022 Mission St., San Francisco.
Trus-Con Sno-wite, manufactured by Trussed Concrete Steel Co. (See Adv. for Coast distributors.

WINDOWS—REVERSIBLE
Perfection Reversible Window Co., 2025 Market St., San Francisco.

WIRE FABRIC
Whitney Adjustable Window Co., San Francisco. (See page 137.)
Wadsworth, Howland & Co., Inc. (See Adv. on page 31 for Coast agencies.)
U. S. Steel Products Co., Rialto Bldg., San Francisco.

WOOD MANTELS
Fink & Schindler, 218 13th St., San Francisco.
Mangrum & Otter, 561 Mission St., San Francisco.

SAN FRANCISCO LOS ANGELES

Residence of Thomas Shields Clarke, Esq., Lenox. Stained with Cabot's Shingle Stains and lined with Cabot's Sheathing Quilt for warmth. Wilson Eyre, Architect, Philadelphia.

The Only Real Stains

If you have only seen the crude and tawdry colors of the thinned-paint imitations of

Cabot's Shingle Stains

you have no idea of the beautiful coloring effects of the true Stains. They are soft and deep, like velvet, but transparent, bringing out the beauty of the wood grain. Half as expensive as paint, twice as handsome, and the only Stains made of Creosote, "the best wood preservative known."

CABOT'S "QUILT"

Cold-Proof, Heat-Proof, Sound-Proof
40 Times Warmer than Common Papers

The many imitations of Cabot's Quilt are the best evidence of its wonderful efficiency and success. Quilt is sold on quality—the imitations are made to sell cheap! Quilt is rot-proof, vermin-proof and almost fire-proof. It is the only deadener that breaks up and absorbs sound-waves.

SAMUEL CABOT, Inc., Mfg. Chemists, Boston, Mass.

Cabot's Waterproof Cement Stains. Waterproof Brick Stains. Conserve Wood Preservative. Damp-proofing, Waterproofing, Protective Paint, etc.

AGENTS { **Pacific Building Materials Company, San Francisco.**
The Mathews Paint Company, Los Angeles. (Stain).
Waterhouse & Price Company, Los Angeles. (Quilt).

Do You Know

Sanitary Drinking Fountains

are used to-day in the Best State, County and Municipal Buildings on the Pacific Coast? Also in Schools, Theaters, Lodge Rooms, Parks, Depots, Etc.

Do You Want the Best? Specify HAWS.

SEND FOR CATALOGUE

HAWS Sanitary Drinking Faucet Co.

1808 Harmon Street, BERKELEY, CAL.

C. F. WEBER CO., San Francisco and Los Angeles

GRAVITY SPIRAL CHUTE

Economical Method of Lowering Boxes, Package Goods and Merchandise

MADE BY

MINNESOTA MANUFACTURERS ASSOCIATION

Manufacturers of Spirals, Automatic Straight-Lift Elevators, Gravity Freight Conveyors and Power Conveyors. Engineers and Designers of Labor-Saving Conveying Systems.

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San Francisco

TELEPHONE SUTTER 678

For Mission Finishes

on woodwork and furniture. Insure a rich lasting dull rubbed effect by using

ONE COAT OF STAIN
ONE COAT OF SHELLAC
ONE COAT OF HILO FLAT FINISH

the jelly-like kind.

HILO

FLAT FINISH

This new and different flat finish contains no waxlike particles to settle out: but always the same jelly-like smoothness from top to bottom of the can.

Its difference from the ordinary liquids makes it of value to you.

Ask for a sample of "HILO"

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SAN FRANCISCO, CAL.

Masonic Temple
San Francisco, Cal.
Bliss & Faville,
Architects
J. E. Steere,
Plastering Contractor

This million dollar Masonic Temple

has been pronounced one of the most beautiful structures West of Chicago. The architects, Messrs. Bliss and Faville, specified "Bickel's Keene Cement" for plastering all walls and wall partitions.

American Keene Cement Co.
OF CALIFORNIA
257 Monadnock Building, San Francisco

"Strongest Keene Cement Known"

STUCCO HOUSE AND TILE ROOF

Red Clay Tile Shingles

(SPANISH)

COULD you ask for a More Beautiful Roof? The Red Tile in Striking Contrast to the Snow-White Plaster Surface.

¶ MISSION CLAY TILE are manufactured by the

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LOS ANGELES

UNITED MATERIALS COMPANY
CROSSLEY BUILDING, SAN FRANCISCO
Distributors for Northern California

Your Building is No Better Than Its Roof—

and there is no better roofing material obtainable than

Copper Bearing Open Hearth

ROOFING TIN

This material has long passed the experimental stage—and has been proved by time and weather to be the most durable for roofing purposes. The tin roof of quality and service is secured as follows:

BASE PLATE — Copper Bearing Open Hearth Steel.
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COATING — 20 to 40 pounds, 30 and heavier recommended.
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PAINTING — Red oxide and linseed oil properly applied.
RESULTS — Good protection, lasting service, satisfaction and economy. You should use no other.

Write for full information on our Copper Bearing Ternes, and for booklet "Copper — Its Effect Upon Steel for Roofing Tin." We also manufacture Apollo Best Bloom Galvanized Sheets, Black Sheets, Formed Metal Roofing Products, Etc.

American Sheet and Tin Plate Company

General Offices: Frick Building, Pittsburgh, Pa.

DISTRICT SALES OFFICES

Chicago Cincinnati Denver Detroit New Orleans New York Philadelphia Pittsburgh St. Louis

Export Representatives: U. S. STEEL PRODUCTS COMPANY, New York City
Pac. Coast Representatives: U. S. STEEL PRODUCTS CO., San Francisco, Los Angeles, Portland, Seattle

HARDWOOD FLOORS

CREATE an Atmosphere of Refinement in the Better Class Apartment House.

This Picture shows the **Caeser Apartments** at Post and Leavenworth Sts., San Francisco; Dunn & Kearns, Architects. All Hardwood Floors laid by

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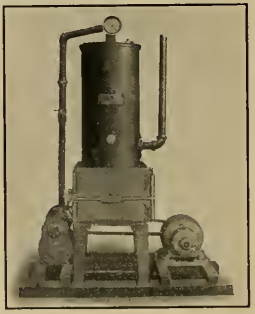

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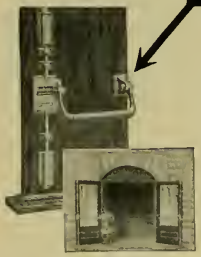

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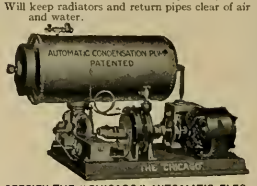

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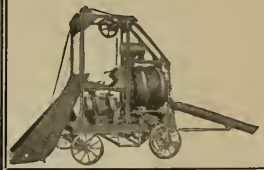

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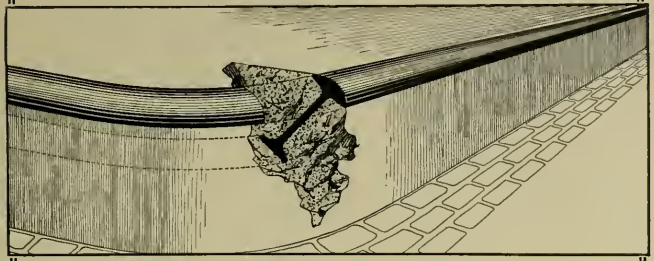

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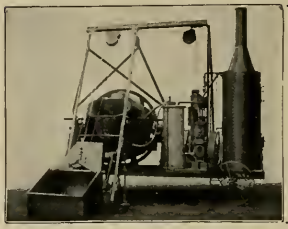

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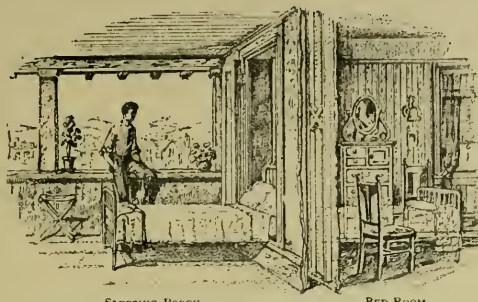

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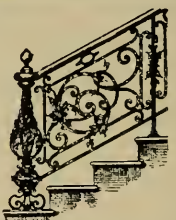

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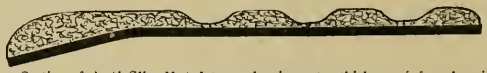

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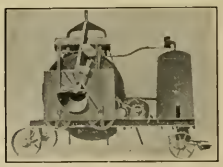

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Frontispiece
The Architect and Engineer
of California
September, 1914

COUNTRY VILLA OF THE HON. JAMES D. PHELAN
NEAR LOS GATOS, CALIFORNIA
WILLIAM CURLETT & SON,
C. E. GOTTSCHALK, *ARCHITECTS*

THE
Architect and Engineer
Of California
Pacific Coast States

VOL. XXXVIII. SEPTEMBER, 1914 No. 2.

The Country Home of Hon. James D. Phelan

Some Random Notes

By B. J. S. CAHILL, A. I. A.

FROM pleasant recollections of many fine homes in various parts of the world I find myself coming to a conclusion, not, perhaps, quite loyal to the architects' profession. In perfect candor one must admit, and the reader on reflection will surely concur, that the most attractive features about some new and lovely country places are often as not something in which the architect has had no hand. And the criticism that comes to mind in so many elaborate and expensive houses that are yet unsatisfactory and without charm, is summed up in one phrase, "too much architecture"!

To avoid the danger of hasty generalizing, perhaps the truth can be squarely stated by considering just how an elaborate and highly organized country home comes into being in a prosperous and growing community such as our own here in California.

A fine home presupposes fine fortune, but men do not all build magnificently for the same motives. With many it is done as a sort of duty, or because others in their class have done the same. In most cases, especially in cis-Atlantic longitudes, it is wholly a woman's enterprise where the home becomes a field of social activities, made possible, though hardly supported by the male end of the menage. Again there is the house which is wholly the hobby of the man who builds it. It becomes the outward expression of his inmost dreams and desires. It is the end and object of his existence to which all other efforts are tributary.

The architect called in to give expression to these varying phases of home building ambition—and of course we mean on a scale of conspicuous rather than average opulence—is likely himself to conceive of a home in several quite different terms.

However commercially successful or academically trained he may be, his efforts in this venture will be of small avail if he is without social experience or out of sympathy with a mode of life whose chief expression he is called upon to provide for in a large and liberal way as well as minutely and in detail. To put the case into concrete form. What sort of success would the latest winner of the Grand Prix make of a commission to design an English country house? Without first-hand knowledge of English country life, or without direct copying, his efforts would be ludicrous. All of which leads back to the main reason why the real charm of a successful country home is so often due to the owner rather than to the designer, and why so many palatial places are offensive because they are laden with "too much architecture."

Conspicuous among the successful homes in the San Mateo County end of the peninsula is Mr. Jas. D. Phelan's villa near Saratoga, Santa Clara county. The architects in this instance have shown fine sympathy in first surrendering to the impress of the owner's will and then giving off a plastic interpretation of a

home which admirably expresses the owner's fine culture and relish of the antique, and this is done without a trace of that formality and coldness which too often mars our modern efforts at the classic. The architect, when left to himself, is too prone to remember only the naked lines and blank surfaces of the Five Orders. He remembers them as mere outlines of archaeology—abstractions of form in bare cold masonry, stripped by time and the elements of their original vestures of color and texture that made them human and habitable. And, after all, the real beauty of a home lies finally in the furnishings and many-hued fabrics that line the interior and in the ever-changing floral setting of the exterior. Not long ago in visiting just such another

"Ample villa bosomed deep in vines,"

the owner pointed out a pergola bordered and festooned in a bewildering wealth of living greenery. He said, "My architect had all these edges paved with solid brick and concrete, but I had these strips of mold placed here instead and my gardener planted them as you see."

The effect was magical and the moral was not to be forgotten either. Perhaps this accounts for the fact that one of the most successful of modern home designers (Mr. Platt of New York) did not begin life as an architect at all, but as an artist and a landscape gardener.

Mr. Phelan's prominence in political life, his career as Mayor of San Francisco and his incessant activities as a public-spirited citizen have combined to obscure the fact that he is essentially an artist. Fate has decreed that he should not practice any particular handicraft, though it may surprise some to know that as an amateur modeller in clay he has a good deal of experience and dexterity. Among the Greeks oratory was counted the greatest of all the arts, and in this particular Mr. Phelan is a past master in the very front rank of the public speakers of this country. In spite of the great handicap which versatility imposes, Mr. Phelan has left the impress of his talent on the architecture of the town in a manner worthy of more than a passing mention. He originated the famous Adornment Society, which in turn financed the Burnham plan for the city of San Francisco. This, on account of the great fire of 1906, finally resolved itself into the Civic Center campaign. And although the bond issue to realize this feature of the Burnham plan failed to carry in 1909, Mr. Phelan's enthusiasm and activity, and the enormous publicity and discussion provoked undoubtedly culminated in the success of the plan finally adopted. Mr. Phelan's particular efforts may have missed fire, and his work may have seemed futile and thankless, but in the light of subsequent events it was clearly a part, and an essential part, in the chain of events leading finally to the great Civic Center scheme now magnificently nearing completion.

II.

The gist of the foregoing remarks is of course to the effect that the splendid villa illustrated in these pages is very much the direct creation of Mr. Phelan, Messrs. Curlett & Son, followed by Mr. Gottschalk acting as architectural interpreters. And this undoubtedly is the correct way to plan for an owner of classic training, wide travel, artistic instincts and conspicuous talent. Nor is this in the slightest to the architect's discredit. On the contrary, it is his correct function—not to impose his own ideas on his client, but to interpret his client's ideas to himself. It is only when the client has no ideas, or is prepossessed of silly, childish or paltry ones, which is not unusual, that it is the architect's duty to "boss" the whole enterprise.

* * *

The climate around San Francisco partakes of so many qualities that almost any architectural style for a home would seem proper at some time or another.

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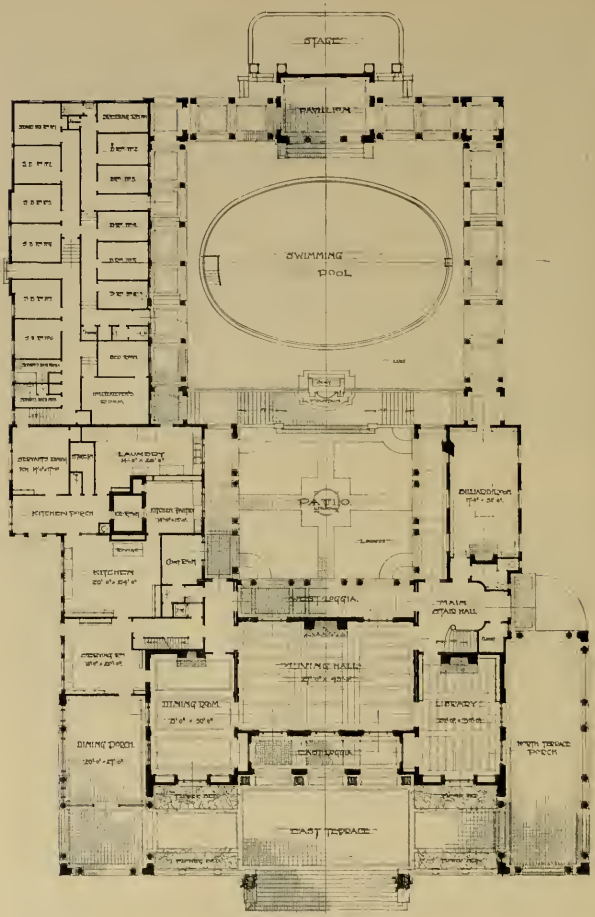
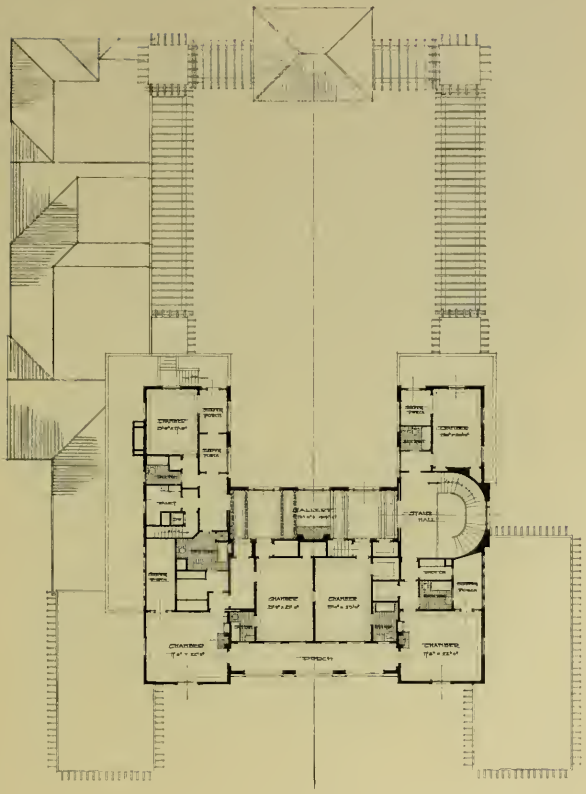


FIRST FLOOR PLAN

COUNTRY HOUSE OF HON. JAS. D. PHELAN
SANTA CLARA COUNTY, CALIFORNIA



SECOND FLOOR PLAN
COUNTRY HOUSE OF HON. JAS. D. PHELAN

OLD SPANISH DOOR PURCHASED BY MR. PHELAN IN GRANADA, SPAIN

MUSIC ROOM, COUNTRY HOUSE OF HON. JAS. D. PHELAN
William Curlett & Son and C. E. Gattschalk, Architects

One of the odd features of much of our home planning is that we assume gentle zephyrs and radiant sun and build porches and pergolas to match, while the fog horn is blowing on the bay and our hills are smothered in mist.

This accounts for the fact that in an hour's ride from San Francisco you can find one great home perched on the hills of Alameda County of the exact form and contour of the lamasaries of Bhotan and Thibet where, perched on the crags of the Pamir plateau you can contract sunstroke in the head and frostbite in the toes at the same instant. The Taylor house in Claremont, designed by Mr. Mullgardt, is wholly Thibetan in style, with huge battered basement walls surmounted high up by a long iterated band of fenestration with big overhanging roof and boulders on it to hold down the shingles in high winds!

A few miles southwest of this Howard & White have planned a stately Tudor manse for Mr. Frederick Kohl—such a house with huge antlered hall, stained glass, organ, and private oratory, as you can see in various parts of the British Isles, all in red brick, slate roofed, gabled and edged with grey stone.

And a few miles away from this is the Phelan Villa, all classic and white, with vivid tiles, great terraces and loggias, pergolas and patios, piazzas and swimming pool—all from the shores of the Mediterranean!

What is the answer? Does our climate call for Tudor Gothic or Italian classic, or has Mr. Mullgardt given us the most subtle answer of all?

* * *

Marion, who had been taught to report her misdeeds promptly, came to her mother one day, sobbing penitently.

"Mother, I—I—broke a brick in the fireplace."

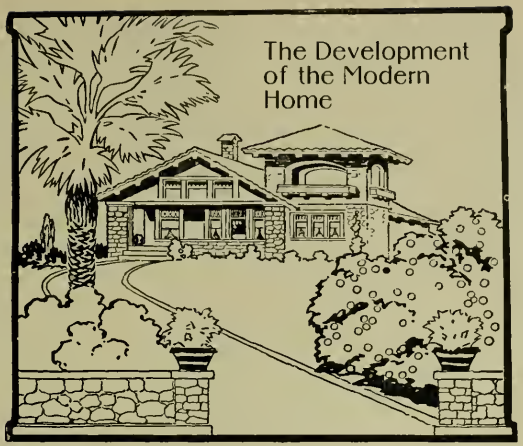
"Well, that is not very hard to remedy. But how on earth did you do it, child?"

"I pounded it with father's watch."—Success.

EAST VIEW OF MR. HENRY W. TAYLOR'S RESIDENCE IN THE BERKELEY HILLS
LOUIS C. MULLGARDT, ARCHITECT

WEST VIEW, SHOWING REAR OF MR. HENRY H. TAYLOR'S RESIDENCE BERKELEY, CALIFORNIA LOUIS C. MULLGARDT, ARCHITECT

RESIDENCE OF MR. J. T. LINDLEY
AZUSA, SOUTHERN CALIFORNIA
R. D. FARQUHAR, ARCHITECT



THE splendid examples of modern homes illustrated in this number have for their prototype the cottage. All the elements in their make-up now so carefully composed with the eye of the artist are fundamentally the plainest forms of village construction, the result of the simplest expedient of the country carpenter, the simplest shifts of unlettered artisans who build quite unconscious of effect and with no other thought than to build durably against the weather with the materials nearest to hand so as to enclose the most space with the least expense. All forms of gables, gambrils, penthouse effects and dormers, added one to another as the original cottage unit for the family developed to a farm house or an inn, form the elements of composition of our most artistic modern homes. From these elements are composed the charming skyline, the variety and the surprises of that type of residence that appeals most strongly to modern cultivated taste. Yet all the elements of these delightful homes are of humble origin. The brick garden wall to keep out animals, the brick steps and walk laid herring-bone style, the low beamed ceiling to save plastering, the deep window embrasures in walls that were thick, the huge beam over these openings, the small window panes, since glass in large sheets is expensive, the crude brick fireplace with wide hood and chimney corner, the half timbered exterior, the overhanging upper story and the steep roof for bedroom space, the hand made furniture and wood work with tool marks showing, and rude thumb latch made at the village smithy of hammered iron, the iron kettle crane and dogs, the front door hung in two halves, and the general random and haphazard lay-out of the whole rambling structure—all these and many others are the elements from which the most quaint, homelike and charming results have been developed in modern house building.

But if a cheap and vulgar version of magnificent architecture is to be deplored in our homes something in turn of absurdity attaches to the expensive and forced version of rustic simplicity. Artificial adze marks on brand new cedar, clumsy brass door latches made at enormous expense, ceilings too low and windows too tiny, ridge poles that are bent on purpose to simulate pic-

RESIDENCE OF MRS. JAMES MOFFITT, EAST VIEW
LOUIS C. MULLGARDT, ARCHITECT

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PALO ALTO, CALIFORNIA
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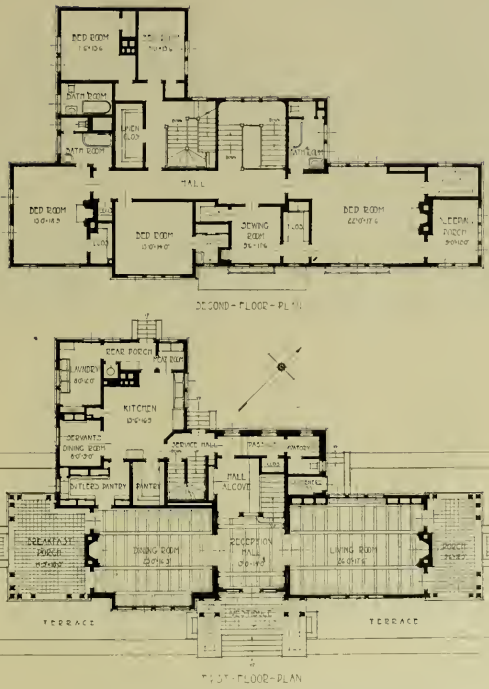

FIRST AND SECOND FLOOR PLANS
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SMITH O'BRIEN, ARCHITECT

HOUSE OF SENATOR MARSHALL DIGGS, SACRAMENTO
Clarence C. Cuff, Architect

HOUSE OF MR. C. B. DEWEES, SACRAMENTO
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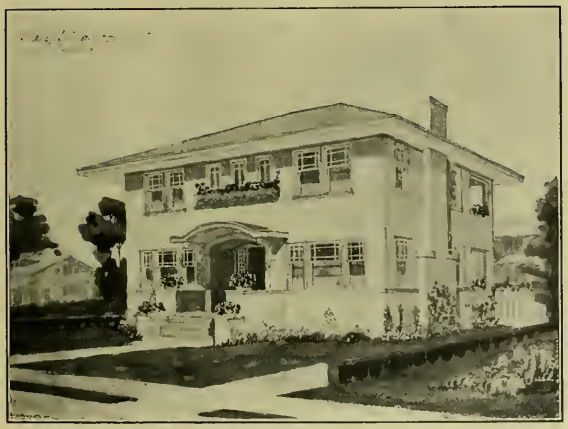

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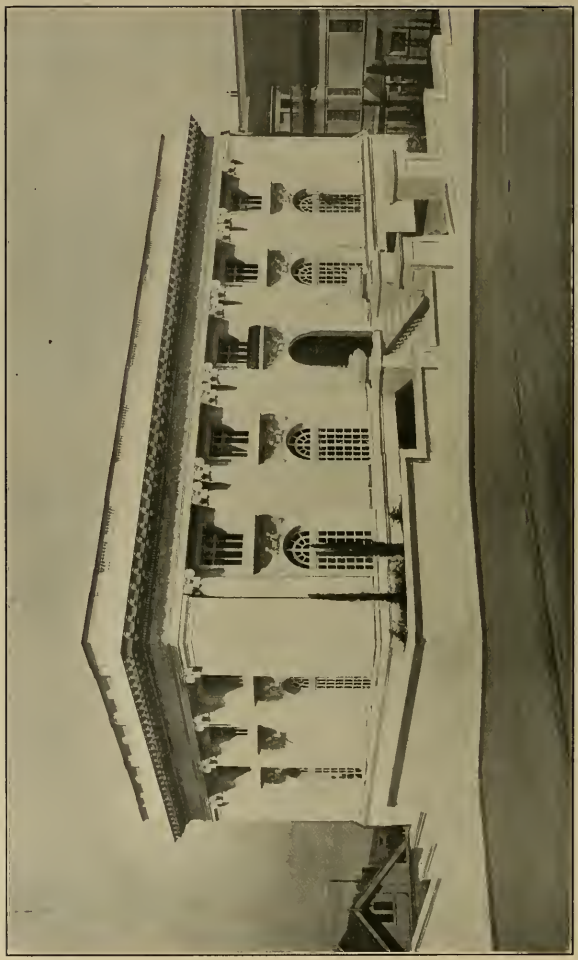

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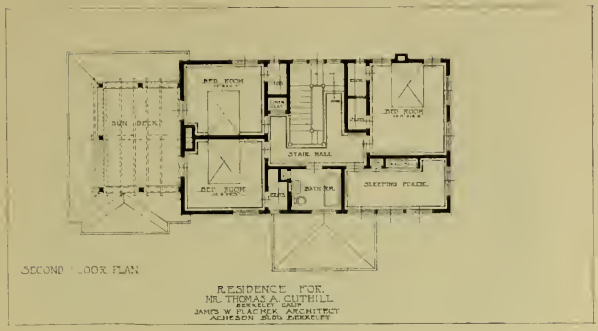

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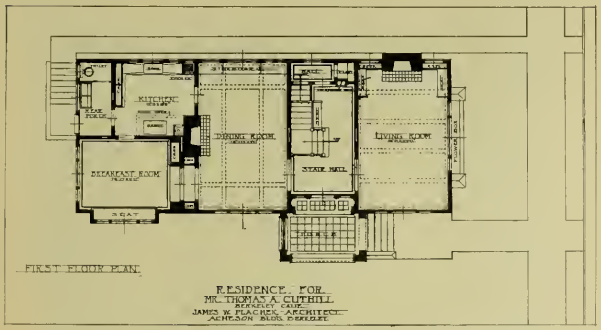
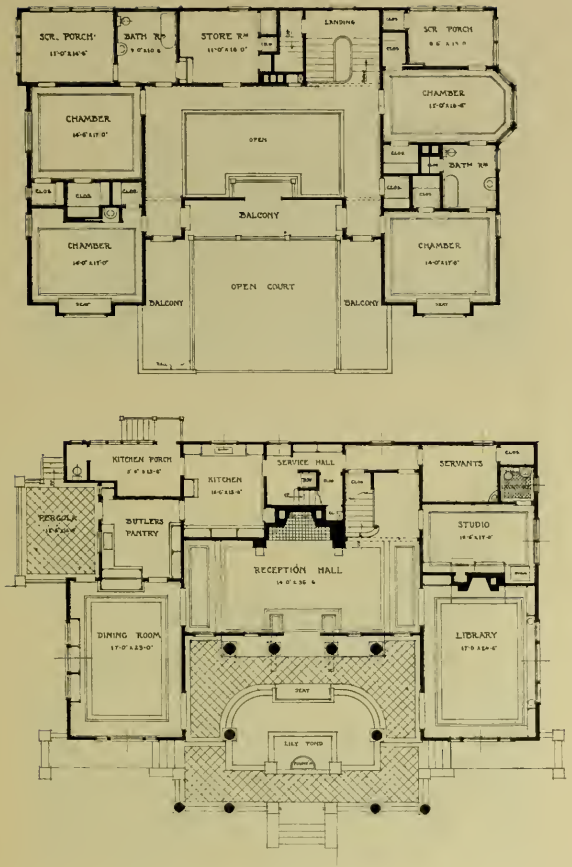
James W. Plachek, Architect



FIRST FLOOR PLAN, RESIDENCE FOR MR. THOMAS A. CUTHILL, BERKELEY
James W. Plachek, Architect

HOUSE OF MR. HUGH M. LA RUE, JR., SACRAMENTO
Seadler & Hoen, Architects

INTERIOR, HOUSE OF MR. HUGH M. LA RUE, JR., SACRAMENTO
Seadler & Hoen, Architects



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Seadler & Hoen, Architects

RESIDENCE, SACRAMENTO, CALIFORNIA
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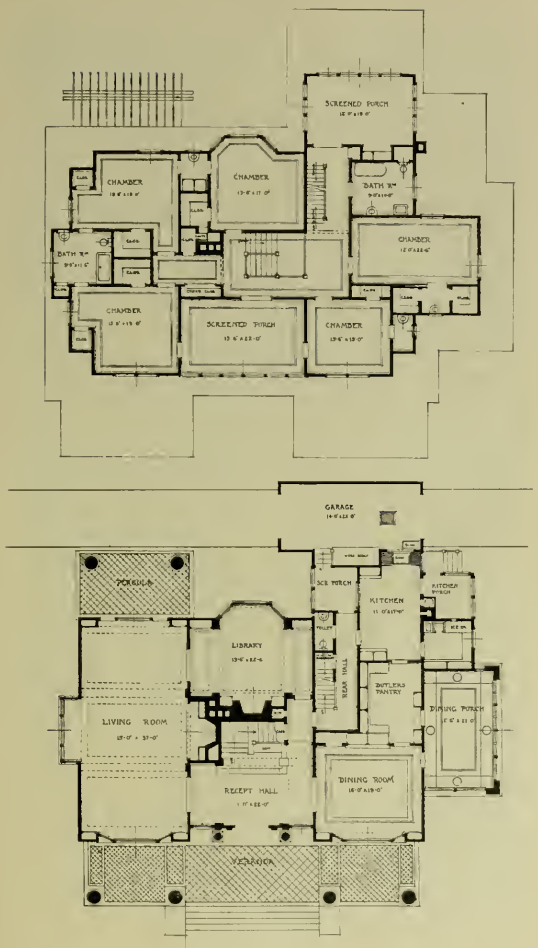
HOUSE OF MR. H. G. MACMASTERS, SACRAMENTO
Seadler & Hoen, Architects



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ENTRANCE COURT, RESIDENCE OF DR. J. B. CROWLEY, SAN FRANCISCO RIGHETTI & HEADMAN, ARCHITECTS

RESIDENCE AND GARAGE, LOS ANGELES, CALIFORNIA
ALFRED F. ROSENHEIM, ARCHITECT

SOUTHERN CALIFORNIA HOME—A RATHER UNUSUAL TREATMENT

RESIDENCE OF MR. S. L. NAPTHALY, SAN FRANCISCO
Willis Polk & Co., Architects

COURT OF NAPTHALY RESIDENCE, SAN FRANCISCO
WILLIS POLK & CO., ARCHITECTS

A COUNTRY HOUSE, DRAWN FROM PHOTOGRAPH

SUBURBAN HOME, SKETCHED FROM A PHOTOGRAPH

DETAILS OF CORNICE, PERGOLA AND GLIMPSE OF GARDEN, RESIDENCE OF ARCHITECT R. A. HEROLD, SACRAMENTO, CALIFORNIA

RESIDENCE OF R. A. HEROLD, SACRAMENTO, CALIFORNIA
R. A. Herold, Architect

AN ATTRACTIVE STUCCO HOUSE WITH WIDE CORNICE

RUSSELL TAYLOR RESIDENCE, BERKELEY SQUARE, LOS ANGELES, CALIFORNIA
Myron Hunt, Architect

RESIDENCE FOR MR. ROBERT C. GILLIS, SANTA MONICA, CALIFORNIA
ELMER GREY, ARCHITECT

turesque decay, and clean wood burned to imitate age—all these are devices that may easily develop into vices, although fortunately the examples here presented are remarkably free from these defects.

Apropos of the preceding considerations in general it may be laid down as a universal law that any interior features whatever that can be called decorative in construction, are either debased remnants of palace architecture or exalted developments of cottage construction, or both combined in various degrees. All columniated schemes, all moulded work, all polished, shiny, and painted or plastic effects belong in general to the former class, while all plain surfaces of natural material, flat coloring, square joinery without mouldings, rough masonry, rough plaster, sackcloth falls, and dull finish of wood, belongs to the latter. High ceilings and symmetrical rooms invariably betoken the palace origin; low ceilings and irregular plan the cottage origin. Any architect on looking around a room can instantly pick out the features that are in the descending as distinguished from those that are in the ascending group

Thus the so-called Colonial style is really a diluted Baronial, a peculiar mixture of cottage conditions and castle aspirations. The heavy stone porticos that make a Georgian manor house so imposing, when transplanted to a pioneer community and thinly rendered in painted pine, while not devoid of a historic interest, must always seem a little prim, a little cold for comfort, for cosiness we demand in a home. However, as an expression of the Puritan spirit, it is perfect. As architecture it is not democratic, and in that sense it is not an American style. Its very name is enough proof of that. It is really palace architecture grafted onto farm house conditions. However, when shingles were substituted for painted clapboards and the classic orders gradually fell into disuse, the cottage character began to assert itself and with the abandonment of formality we can trace the beginnings of comfort and homelike simplicity.

Judged by some standards the planning of homes is the most thankless branch of an architect's profession. It demands the maximum of effort and talent and the minimum of reward, if rewards be measured by dollars and cents. There is no type of building on which one must lavish so much study and attention, as a moderate-sized residence—such a one that ranges in cost from five to fifteen thousand dollars. Every room is a problem in design, each wall and each ceiling is a separate study. The four or more aspects of the exterior demand equal attention. Be it understood that by homes we mean characteristic, interesting, or artistic dwellings of the best type that the age has developed. These are not, we submit, the mansions of the very wealthy, however interesting these exotics may sometimes be, nor the commonplace houses of the many, but the homes of men and women who shun the pretensions of "high life," yet would add grace and beauty to that simplicity of living which is the basis of good citizenship.

The architecture which best expresses this wholesome, this sturdy ideal is, as we have pointed out, developed mainly from what might be called the cottage craftsmanship of the plain people, as distinguished from the degenerate elegancies and the diluted and grandiloquence of styles invented long ago and far away for the palaces of sovereigns.

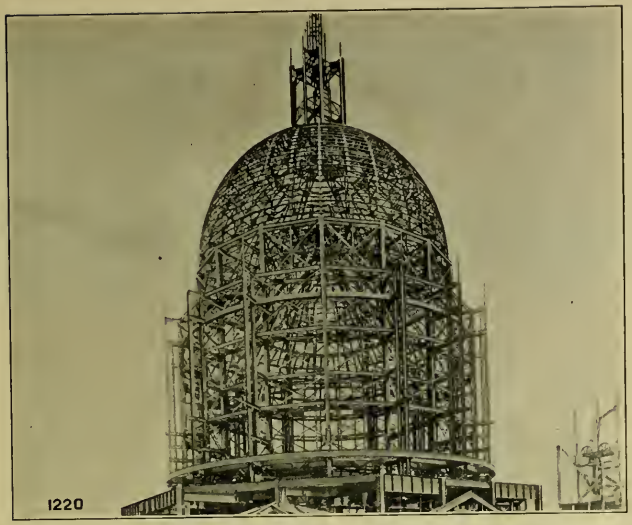
* * *

It Caused Her to Think

"I say, mamma," said little Willie, son of a prominent Milwaukee architect, "is it true that when you first met pop you had fallen into the water and he jumped in and saved you?"

"Quite true, my dear," replied mamma, smilingly.

"Then I wonder if that's why dad won't allow me to learn how to swim!"



DOME OF SAN FRANCISCO CITY HALL
Bakewell & Brown, Architects
Steel for the entire building furnished by U. S. Steel Products Company [American Bridge Co. Div.]

SKETCH FOR BUNGALOW WITH FLOOR PLANS
Samuel Arnold, Architect

Architectural Features of the New Station and Office Building of the Michigan Central Railroad

F. A. PRUITT, in Engineering and Contracting.

REAR ELEVATION MICHIGAN CENTRAL RAILROAD
Showing Office Building and Train Shed

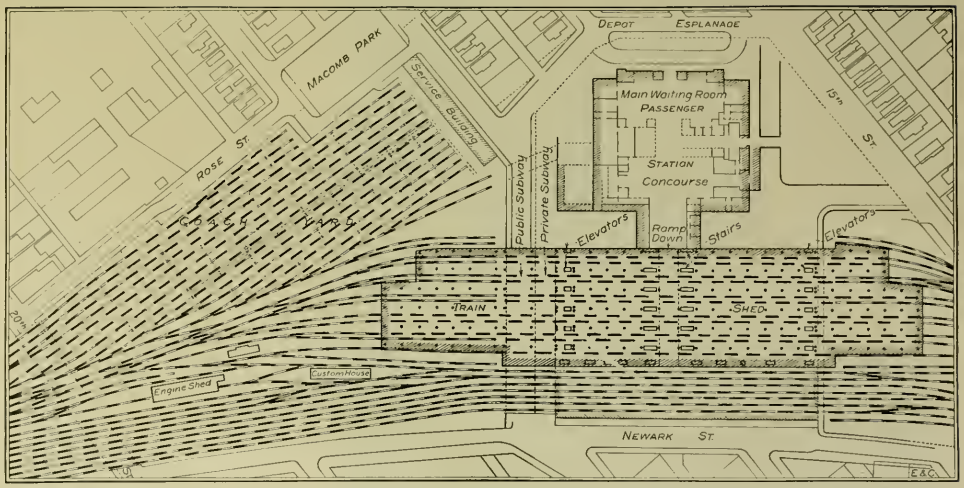
THE Michigan Central Railroad Co. has recently completed, at a cost of about $2,500,000, its new station and office building at Detroit, Mich., this improvement being the last step in the extensive plan worked out by this company. The entire project includes the tunnels under the Detroit River, the train sheds, yards and equipment, grade separation and bridges, coach yards, service building, warming building, hump yard, custom house, inspection sheds, wheel pit, signal towers, yard electrification, team tracks, etc. With this work completed the company now has at this point one of the most complete and fully equipped plants for the handling of freight and passengers to be found in this country.

To avoid the shuttle movement of all trains which was necessary when entering and leaving the old station the new terminal was located on the main line about one-half mile northwest of the tunnel portal. With this location and with the cross-overs in the train shed in use about thirty minutes can be saved in making up the trains and getting them across the river, from that required to operate to and from the Third Street station.

The general scheme is that of a through station layout with ten passenger tracks and one express track under the cover of the train shed. There are seven through freight tracks in the open south of the train shed and parallel to it at the same elevation. All of the tracks are supported on a steel substructure for a distance of about 640 feet, the usable space under the right-of-way being occupied by the United States mail service and by baggage and express companies, etc.

In designing each part of the terminal provision has been made for a considerable increase in traffic above that now required by the Michigan Central, in order that other roads in the city may be accommodated as tenants at any time they so desire. There is a possibility that the Grand Trunk and Lake Shore may later use this station. The Michigan Central alone handles, on an average, 5,000 passengers daily, with an estimated maximum of 9,000 on special occasions. The old station accommodated seventy-five trains, with a total daily capacity of 544 cars.

Location.—The station is located a little more than one and one-half miles west of the city hall and about the same distance from the old Third Street station. It is about 800 feet south of Michigan Avenue, between Fifteenth and Seventeenth Streets, on Depot Esplanade, a new street and parkway, which was opened by the separation of grades.



LAYOUT OF PASSENGER TERMINAL OF MICHIGAN CENTRAL R. R. AT DETROIT, MICH.

FRONT ELEVATION OF MICHIGAN CENTRAL RAILROAD STATION AND OFFICE BUILDING, DETROIT, MICHIGAN
Reed & Stem and Warren & Wetmore, Architects

Approaches.—All of the approaches have been designed and the grades separated so as to give the most efficient and easy access to the station and train shed, both for the public and for the tenants using the rooms under the tracks.

At the east end of the station there is a driveway about forty feet wide, sloping from Fifteenth Street downward on a five per cent grade under the covered bridge which connects the station and the car shelter. This driveway gives access to the basement entrances leading to the basement elevator hall and to the machinery room which is directly under the main concourse floor. The driveway and a similar approach, which is perpendicular to and just south of the car shelter, merge into a large court about 78 feet wide and 240 feet long. This gives ready access to the mail department, which occupies the space under the tracks adjacent to this court.

Just north of the station and its surrounding sidewalk there is a curved driveway about twenty-five feet wide leading from Fifteenth Street around the granite balustrade to Sixteenth Street. Between this driveway and the Depot Esplanade there is an ornamental grass plot with blue flag stone landing and granite balustrade and benches.

On the west side and parallel to the station there is a forty-foot driveway leading up to the carriage entrance which is under a low roof outside of the main office building. West of this driveway and separated from it by a granite balustrade is a driveway on about a three per cent down grade, which opens into a large court similar to the one on the opposite side of the building. This court is used by the baggage wagons, the baggage room being directly opposite under the tracks. Further west the Depot Esplanade and Seventeenth Street merge into a public subway leading under the tracks and connecting with Seventeenth and Newark Streets on the south side of the train shed. Just east of this public subway and parallel to it there is a forty-foot private driveway along the west end of the baggage and express rooms, which is used by baggage and express exclusively.

South of the train shed and parallel to it there is a driveway under the express companies' offices, which is used entirely by the latter.

The lower story of the main building, which includes all of the station facilities, has a frontage of 345 feet and a depth of 266 feet. These dimensions are maintained up to the top of the waiting room and concourse roofs. Above this level the office building, which is in the shape of the letter "I", rises to a height of approximately 240 feet from the curb to the top of the penthouses.

From a structural standpoint the building may be described as consisting of three separate parts. Along the Depot Esplanade the general waiting room, with its adjoining women's room, reading room and tea room, has a depth of 104 feet and a height of about 63 feet to the Guastavino arch ceiling. Directly to the south of the waiting room the building rises fifteen stories above the high arches of the arcade ceiling. The "stem" of this part of the building is 54 feet wide by 241 feet long. At each end of this narrow stem there is a bay fifty-two feet wide by 106 feet long which completes the I-shaped outline of the office portion.

The concourse with its entrance for pedestrians on the east end and cab entrance on the west is located south of and parallel with the office portion. This room is 78 feet wide, with a flat copper ceiling about 41 feet above the street level. Leading south from this concourse there is a 76-foot ramp, which grades down on a seven-per cent slope into the passenger subway under the tracks of the train shed.

The high portion of the building at the pipe loft and storage floor levels is separated from the waiting room and concourse by 13-foot courts with hip-and-valley tile floors. These courts provide light for all offices on these levels, which would otherwise be shut off by the concourse and waiting room roofs.

Type of Construction.—The entire building is of fireproof construction, the steel skeleton framework being covered with stone, brick, terra cotta or concrete.

The foundation is one of the first of its kind ever attempted for a building of this magnitude, a reinforced concrete mat being used under the entire building. The original design provided for caissons, but the experience of the Detroit River Co. in the construction of its tunnels

VIEW OF EAST PORTION OF MAIN WAITING ROOM, MICHIGAN CENTRAL RAILWAY STATION
Reed & Stem and Warren & Wetmore, Architects

showed that the blue clay had a tendency to flow under heavy pressure, and the borings showed that the average distance to rock was 110 feet. These conditions, together with the fact that there was a possibility of striking a sulphur vein, such as was found in constructing the Ford building, lead to a very exhaustive series of tests on the bearing power of clay and of several types of concrete piles. This series of tests indicated that piles were inadequate, and a reinforced concrete mat was decided upon. This mat has a thickness of 42 inches under the high office portion and 30 inches under the waiting room and concourse. As the type of foundation was changed after some of the columns were fabricated it was necessary to build up piers from the mat for some of the columns.

From the street grade up to the sills of the large waiting room windows which conform to grade the outside walls are of pink granite. From this elevation to the window sills of the first office floor the walls are of dark blue Bedford limestone; and from this level up to the twelfth office floor a light-colored pressed brick, which harmonizes with the stone, was used.

At the twelfth office floor the building sets in about two feet, thus providing space for the columns and festoon spandrels which are constructed of light gray terra cotta. The terra cotta construction continues up to and includes the massive overhanging cornice. The entire main roof of the office building, as well as that of the reading room, tea room, women's room and the flat roof over the offices of the low building, has

a pitch-and-gravel roofing. A copper roofing with standing seams is used for the waiting room, concourse, cab stand and car shelter.

The car shelter at the east end of the building is reached from the main arcade or the vestibule at the east end of the concourse by means of a covered bridge which is 21 ft. 9 in. wide and which extends over the inclined driveway along the east side of the building. This shelter is adjacent to the trolley car loop, it is 17 ft. 9 in. wide and about 300 ft. long, and is built on a radius of sixty feet. The framework of the shelter is of ornamental steel with the street side entirely enclosed with metal sash windows. A wood floor was placed in this shelter temporarily until the back fill settles to its final position, at which time it is intended to replace it with reinforced concrete slab construction.

The terminal building contains 7000 tons of structural steel, 125,000 cubic feet of stone; 1,500,000 face brick and 7,000,000 common brick. The foundations and side walls required about 20,000 cubic yards of concrete and about 500 tons of reinforcing bars. The concrete fireproofing and the reinforced concrete floors required about 5,000 cubic yards, in addition to that used in the train shed and other outlying buildings. The train shed superstructure required 3,500 tons and the substructure about 9,000 tons of structural steel. The station proper has a volume of about 11,000,000 cubic feet.

The entire ground floor of the building is used for station purposes. There are three entrances, the one on the north side will accommodate those who come in private cars; the one at the west end of the concourse is for those arriving in taxicabs; and the one at the east end of the building will be used by people arriving in street cars. It is estimated that fully seventy-five per cent of the public will use this entrance, which directs them down the arcade, past the ticket lobby to the ticket windows.

The high building, which rises above the center of the station, is 345 feet long and 240 feet high, the central portion being 54 feet wide and the wings at each end 108 feet wide.

The first floor above the ground floor is the mezzanine, which includes the rooms west of the concourse and the paymaster's telegraph and telephone rooms, etc., to the east of the concourse.

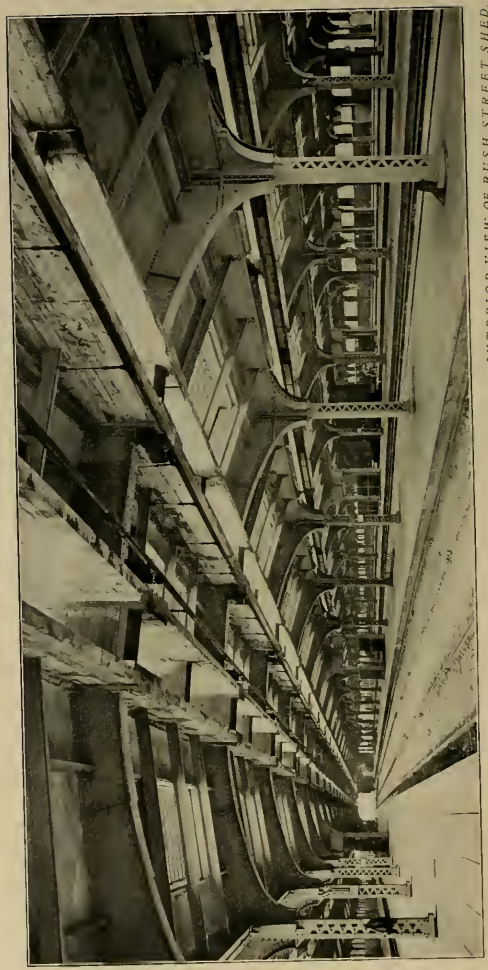
The next floor above this is a storage floor, with a few offices at the east end. At the west end of this floor and directly over the restaurant there is an employees' lunch room which is operated on the self-serve plan.

The next floor is the pipe loft, which will be used for the distribution of the heating and plumbing systems, etc., as well as for a store room.

Above this are thirteen office floors, each having an area of about 24,000 square feet. The story height for each is 12 ft. 6 in., and the arrangement of offices is similar. A 12-ft. corridor runs along the central axis of each of these stories.

The mechanical plant for all the buildings and yards is controlled from the basement of the main building where the boiler plant and the machinery room are located. The boiler room is directly under the cab entrance at the southwest corner of the high building and is equipped with five 450-horsepower "Toledo-Flanders" water tube boilers, with provisions for the future installation of another boiler of the same capacity.

The coal for the plant is delivered into a reinforced concrete hopper located at the south end of the service building. The top of the hopper is at the elevation of the rail, and the coal cars switch over the hopper and dump by gravity. The capacity of the hopper is about ten cars. From



INTERIOR VIEW OF BUSH STREET SHED.
MICHIGAN CENTRAL R. R. STATION, DETROIT, MICH.

the bottom of the hopper the coal passes through the coal crusher onto a motor-driven belt conveyor, which delivers it through the large concrete coal and ash tunnel to the electric-driven bucket conveyor. These conveyors work in unison. The bucket conveyor distributes the coal over the continuous coal bunker in front of the boilers, where it is fed to the stoker grates by means of hand chain movable chutes.

The ashes are loaded into the ash cars directly under the boilers. These cars are operated by hand through the tunnel on a narrow-gage track, and are dumped into the ash pit just south of the coal crusher, where the ashes are loaded and are conveyed to the cars on the yard tracks above.

The machinery room is equipped with the most efficient type of pumps, compressors, incinerator plant, refrigerating system, etc.

The large house and fire tanks are located in the west penthouses of the office building. The surge-tank elevator tank, pneumatic tube tanks, etc., are located in the machinery room. The heating system for the entire office building, from the pipe loft up, is of the down-feed type; while the ground and mezzanine floors are supplied by the up-feed system. Each office floor has 72 radiators, the total radiation for the whole building being about 125,000 square feet. The vacuum return is used for the station as well as all the outlying buildings and yards. The station proper is operated under the "Johnson" system of thermostatic control, while the train sheds and other buildings are under hand control.

The building is equipped with a complete fire alarm and protection system, a cold water drinking equipment, pneumatic tubes and a dictaphone system.

The piping and wiring have been completed for a watchman's clock system, a vacuum cleaning plant, a train announcing device and telautograph system.

The electric power is 4,600-volt, three-phase alternate current. In order to eliminate as nearly as possible the chances of failure of supply, three independent main feed cables were installed. Two of these come from the Commonwealth-Edison generating plants, and are brought in from opposite sides of the building. The third line is run from the company's sub-station located near the foot of Tenth Street and the river. The current first passes through hand controlled switches, down through the transformers and then to the main switchboard or motor generators. Direct lighting is used throughout the terminal, with the exception of the barber shop, where indirect fixtures have been installed.

In wiring the offices provision was made for easy maintenance by use of a removable base mold, back of which the wires are placed. On the floors occupied by the auditor's departments dictagraph plugs have been installed under the desks, and numerous plugs have been installed throughout the building for fans, drop lights, etc.

An automatic telephone system has been installed throughout the various offices.

The terminal building was designed by Reed & Stem and Warren & Wetmore, architects, under the direction of Mr. George H. Webb, chief engineer, Michigan Central R. R. and the Detroit River Tunnel Co. The steelwork for the terminal building was designed by Balcom & Darrow, engineers. The train shed and the outlying buildings were designed and the construction work directed by the railroad's architect, Mr. Edward W. Smith. Mr. W. B. Goddard, Jr., was engineer in charge of the inspection, being assisted by the writer.

Bronze*

By WILLIAM A. NEWMAN, A. I. A.

IT IS but a few years comparatively since bronze was practically unknown in the general practice of architecture in this country, and in most modern architectural text books the subject is scarcely mentioned, or not at all.

But a short time ago exterior and interior fittings and trim for costly public and private buildings were of wood, sometimes handsomely carved, but as we now see it, heavy and cumbersome. Today a lighter and more cheery aspect has taken its place, through the use of bronze, which we now look up to, not only as minimizing the fire hazard, but with pride, satisfaction and public appreciation.

In the early ages of the world's history bronze work was separated into two broad classes, cast and hammered, but in recent years have come many other processes together with bronze-covered work. The origin of the age of bronze is lost in remote antiquity, but in no essential did the earliest known methods of molding and casting differ from those of the present time.

The introduction of labor saving devices and improved methods of construction have been potent factors in reducing the former high cost, and bringing this work into more general use, as well as the low cost of maintenance and absence of depreciation.

Many manufacturers take pride in their products. Castings, clean and smooth with ornamental detail, are executed with a crisp and sharp distinctiveness, and in their modeling departments employ the most skillful modelers and wax workers.

Of recent years the best American shops have been training mechanics especially for this class of work, and so far has the standard advanced that the American product at its best is in no way inferior to that of the European craftsmen.

A recent visit to one of the largest bronze works near New York City, the writer found most interesting.

There are many kinds of bronze—differing in their proportions and constituents, according to the purposes for which they are to be used, but we are interested more especially in those entering into building construction and equipment, and the following are therefore mentioned:

Phosphor Bronze

The main feature of this bronze is its remarkable hardness and resistance to wear, and where this quality is required there is no alloy to surpass it. When lead is added it may be used for bearings and pivots.

A standard formula for phosphor bronze for boiler fittings, pumps, etc., is 79.7 per cent copper, 10 per cent tin, 9.5 per cent lead, .8 per cent phosphorus.

Manganese Bronzes

Their principal feature being their strength at high temperatures. The addition of manganese does not materially harden the copper, but raises its tensile strength. Some of these compositions, cold rolled, have an ultimate tensile strength of 50 tons per square inch, and would be composed of about 84 per cent copper, 10 per cent tin, 6 per cent ferro-manganese. With the

* Paper written for the Society of Constructors of Federal Buildings. Mr. Newman is Chairman of the Committee on Building Laws, S. F. Chapter, American Institute of Architects.

addition of aluminum the alloy shows a remarkable property of resistance to the action of corrosive liquids.

Aluminum Bronze

Applied to alloys of copper and aluminum containing from 2 to 10 per cent of aluminum,—gives a beautiful color very closely resembling pure gold, used largely in art castings and cheap jewelry.

A good bronze mixture, as used in modern ornamental work, contains about 89 per cent copper and 11 per cent tin.

We are all more or less familiar with most beautiful specimens of highly wrought bronze. The metal being softer than iron is much easier to shape and the results depend upon the art of the worker.

The methods of making bronze castings do not differ in principle from those for making iron castings of the same dimensions.

The ordinary type of furnace for bronze casting is sunk under the floor level. The crucibles are of graphite.

Success in casting depends not only on the skill and care of the mechanics, but on correct and well made patterns, which are usually of wood, although metal patterns are made when many castings are required. The thickness of the metal may be reduced to the minimum, by using a false core or drawback. The pattern must be made larger than the casting required to allow for shrinkage which is usually about one-quarter of an inch to the foot, and ample for the finishing of the casting later.

Rounded edges are easier to cast than sharp edges and angles, which do not leave the sand as readily without causing defects. Wood patterns are shellacked to protect them from the moist sand and allow the pattern to leave the sand freely.

Special sand is procured for fine cast work and loam mixed with it. When an opening is to be left in the casting a core of baked sand of the exact size and shape of the opening required is placed in the mold, and the molten metal runs around it.

A few of the most common defects in castings may be mentioned. Minute holes showing on an even surface are caused through carelessness in making the molds or in handling them after they are made—loose sand being allowed to fall into the pattern prints. When the metal is poured in the sand and metal become mixed. This can be avoided to some extent if a bellows is used to clean out the molds before being put together. Blow holes are not generally noted until after the casting has been cleaned. They are due to moisture in the molds which generates steam, and if there are no vents, these defects occur. Clogging is when a casting instead of coming clear has lumps of metal in the ridges, etc., and is the fault of the pattern. Misshapen castings may be caused through the molds not having been screwed up tight enough.

From the foundry the castings are cleaned of the sand, and then comes the fine and careful chasing. Castings, in the eyes of the uninitiated utterly ruined, and apparently fit for the scrap pile, bent out of shape, with flutings of columns warped, and ornament otherwise full of voids and defects, when finished and hand-chased are found to be as beautiful and sound, apparently, as the most perfect casting. In this condition they reach the assembling room. Bronze castings are generally in small sections. In the case of a ten-foot long entablature for a bay in the P. O. lobby, this would be cast in three or four sections and soldered together so that the joints can hardly be seen on the closest inspection. In the assembling room the work is fitted and put together in such sections as can be easily shipped. It then goes to the plating department where it receives the approved finish, and may be treated by special processes to represent any age.

It is often desirable to produce certain artificial effects of color or tone to render the work attractive. These effects are produced by several well known

means. Modifications are constantly sought for with a view of giving variety. Many finishes are put on by secret processes.

It is essential that cleanliness be observed in the preparation of the bronze to receive the deposit, as the merest speck of tarnish, oxide or grease, such as may result from merely fingering it, suffices to prevent the adhesion of the coating metal at the points affected. The metal is first dipped into a cleaning solution of potash, nitrous acid or sulphuric acid and water, which restores its natural brilliancy.

The electro-plating solution to be deposited on the bronze varies according to the finish desired. Almost any shade from brown to red can be obtained by timing the immersion in a solution of nitrate of iron and hyposulphite of soda, afterwards washing in water and drying in sawdust. To bring out the finishes mechanical treatment is given, such as scouring with sand and pumice, using various types of brushes and polishing with a lathe and dolly.

For a green or antique bronze, a solution may be used composed of acetic acid, carbonate of ammonia, or sal-ammoniac and common salt, cream of tartar and acetate of copper. At the end of 36 hours the bronze will be found to be entirely covered with verdigris which presents various tints. The prominent parts may then be brushed with a waxed brush. The relief parts may be set off with hematite or other suitable colors. Light touches with ammonia impart a blue shade to the green parts.

Bronze may also be tinted with fumes from chloride of lime over which a little hydrochloric acid has been poured.

Lacquer which is a solution of shellac in alcohol, or spirits of wine when applied for inside work, protects the finished tones and color.

Bronze-Covered Work

The cores for this work are constructed of white pine, cyprus or oak, the latter used for doors, and before covering are given a bath in linseed oil. Generally the sheet bronze covering varies from No. 16 gauge to 24 gauge. Where the sections are small they are run through a steel die which draws the metal firmly about the core.

For sections too large to pass through dies the covering is drawn under heavy pressure around the wood, eliminating buckles and loose work.

Invisible butt joints are produced by brazing to a bronze plate directly under the joints.

Panels are built up of two sheets of heavy sheet bronze with a sheet of asbestos board between, cemented together under hydraulic pressure.

In the combination of bronze-covered and cast work there is offered a reduction in cost approximating 25 per cent of the cost of cast bronze.

Extrusion Process

Bronze moldings, cornices, rails, and pilasters, constant in section, may be manufactured by this process.

A billet is cast of a convenient size, reheated until it is of plastic consistency and then placed within a cylinder, at the end of which is the die.

Hydraulic pressure is applied and the plastic metal forced through the die issuing in a long bar of the cross section required.

The very high pressure, frequently 30 tons to the square inch, to which the semi-plastic metal is subjected, renders it perfectly homogeneous and free from possible casting defects. Shapes which cannot be rolled or drawn can be made readily by this process, which gives uniformity and clean cut architectural lines throughout.

By patent processes ornamental castings in healthy metal can be produced having undercut sections at practically the price of flat ornament, offering the designer possibilities that have heretofore been prohibitive.

The cost of bronze varies considerably in different sections of the country, especially where transported long distances.

At the San Francisco Post Office (1903) five pair of ornamental bronze exterior doors, with trim, etc., erected complete, cost $15,000, or $47.00 per square foot.

Twelve 10 foot bronze lamps erected complete, cost $950.00 each.

Fourteen bronze lanterns, about 2′0″x8′0″ cost $600.00 apiece.

At the San Francisco Custom House (1911) three pair of ornamental bronze doors, with trim, etc., erected complete, cost $11,200.00, or $41.00 per square foot.

The following prices are quoted from the Supervising Architect's letter contained in the recent report of the Public Buildings Commission.

One bay (10 to 12 feet) of post office screen:

In bronze	$1,000
In cast iron	335
In wood	250
For bronze desk	550
For cast iron desk	180
For wood desk	125

The cost of lamp standards would vary according to the type; bronze costs about three times as much as cast iron. A fair estimate of the cost of a bronze lamp standard would be $600 apiece, and for cast iron $200.

Bronze doors and frames would cost about $1,200; the same in wood would cost approximately $250.

* * *

Marble as a Diffuser of Light

THE Electrical World calls attention in the following article to the possibilities of marble as a diffuser of light in interiors.

"In the so-called 'marble light,' a recent production, translucent marble plates are employed as the diffusing substance instead of the usual white glass in illumination fittings. Marble plates of one-eighth inch to 25.32 inch thickness can be made translucent by a special grinding and impregnating process so that they are superior in translucency to white-glass plates of normal thickness. Colored marble plates of this thickness give beautiful light effects which cannot be imitated at all by means of colored glass. On some of the German transatlantic steamers skylights are used consisting of colored marble plate illuminated by electric incandescent lamps. A pure white light is obtained while any irritating effect is avoided. No difference could be found between marble and white glass as to translucency for ultra-violet rays. The only difference between marble and white glass is that if the two media permit the same amount of light to pass through, marble absorbs the dark heat rays to a much greater degree than any other medium, and it is thought that this fact explains the beneficial physiological effect.

"Ever since the system of indirect lighting has been held in such favor, use has been made of suspended basins of alabaster, glass or porcelain, sheltering groups of incandescent electric bulbs. The employment of alabaster for this purpose was suggested by its natural translucence. In describing the English work we said that marble could be used for these indirect-light basins and would give a better effect than alabaster, because of greater beauty in color and marking. Of course all marble is not fitted for this purpose, because some of it is so dense and fine-grained as to be practically opaque, unless it can be so treated as to increase its translucence. Nearly all of the coarse-grained marbles are extremely translucent, and some of them are semi-transparent. Marble is much stronger than alabaster and there would be little difficulty in turning it down sufficiently thin to permit the passage of light."

Business Integrity and Higher Ideals

By F. H. GLIDDEN, founder of The Glidden Varnish Company.

IN RETIRING from the presidency of The Glidden Varnish Company, after forty-eight years' experience, I have been asked by Mr. E. M. C. Whitney, Manager of The Architect and Engineer, if I would not write an article for publication, giving some of my views—gathered from my vocation and years of observation. At first thought I passed the matter by, as by no means do I consider myself possessed of literary consequence. However, upon second thought I concluded that courtesy should be extended to a request coming from the manager of a journal of such a standard and devoted to the upbuilding of great cities, and I concluded to make the effort and so informed my friend in response to his request. In so doing I shall ask to be spared the semblance of egotism on my part, as I will find it necessary to narrate some of the incidents of life which led up to my business career.

* * *

IN THE fall of 1858 I was induced to go from my home in Maine to Alabama to engage in steamboating, as clerk and purser of a steamer. The following year there were murmurings of the civil war, which later developed into serious reality. When it came I found myself isolated with my little family from all my relatives for a period of four years until peace was declared. On one of my last trips up the Tombigbee River our steamer, the "Admiral," was seized by the Confederate government to carry stores to Mobile "with all possible haste." The boat was quickly loaded and we were ordered to proceed without delay. The following morning the pilot called to the captain saying there was a large encampment at "Lewis' Ferry." We were halted at that point by command of General Polk and ordered to land. A pontoon bridge was constructed across the river and the army of thirteen thousand crossed over. A few days later General Polk was killed by a six-pound shot from a federal battery. His army was being pursued by General Sherman.

* * *

AFTER the war I returned to my old home in Maine, broken in health and as poor as the proverbial "Church Mouse," my only asset being a beloved wife and three children to provide for. I accepted one of the first positions offered, which came through a friend who had recommended me to the old and popular varnish house of William Tilden and nephew of New York, for whom I worked ten years, then resigned to go into the varnish manufacturing business which was established in April, 1875, under the firm name of Glidden, Brackett and Company. Later on the present The Glidden Varnish Company was incorporated.

The policy I adopted was first to establish a reputation for quality of goods and integrity in dealing, always instructing salesmen never to speak disparagingly of a competitor or his products and to remember always to be respectful and patient in soliciting business.

I WAS a salesman for fifteen years and believe there is no occupation requiring more tact and study of human nature. Gain all the knowledge possible pertaining to your business and be careful not to intrude upon those you call upon in soliciting business. I remember once of calling upon a merchant who was busy at the time and I waited a while before presenting my proposition. He finally came to me and asked what he could do for me. I then presented my card, which he abruptly handed back saying, "I have no time to talk to you," and left me unceremoniously. I was deeply chagrined by his abrupt manner and waited for his return from the rear of the store. When he again approached me saying, "Didn't I tell you I wanted nothing and had no time to talk to you?" With feeling akin to subdued anger I politely said, "Mr. . . . :, I will wait until you can spare a few moments." He peevishly said, "What have you got?" A brief explanation brought me an order and I left feeling I had mastered myself and gained a victory which was a valuable lesson as a salesman, and which served me well in after years. I sought to know my customers' requirements and to gain their confidence, and business friendship if possible.

The growth of our business has been largely due to the following of this policy. We started out with a modest plant in 1875, consisting of a quarter acre of land and a small factory building having but two fires, one for melting gums and one for preparing oils, etc. The increase in business gradually developed until it became necessary from time to time to acquire more land and buildings until we reached the limit in space, when a disastrous fire occurred and made it necessary to seek other quarters and erect a new plant, which culminated in our purchasing seventeen acres of land upon which we expended a half million dollars in erecting twenty-five steel and concrete buildings of the most modern type.

* * *

I ALWAYS sought to employ the best help obtainable, and in this regard we have been successful, now having an organization of men who have been with us in various capacities ranging from five to thirty-seven years. Many of these men have grown up in the business and are stockholders to quite an extent and their loyalty and capability together with that of my four sons is the sequel to the upbuilding of one of the most prosperous varnish houses in the world, whose business not only covers our own country but reaches to various ones on this continent and Europe as well. Our South and Central American business, which has been established for four years, we expect will naturally be enhanced by the opening of the Panama Canal.

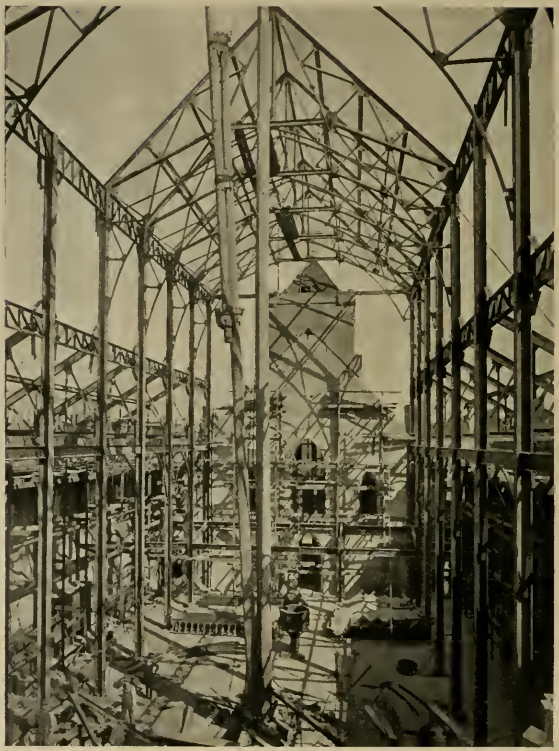
FRANCIS H. GLIDDEN.

Cleveland O., July 27, 1914.

* * *

It's a Good Letter, After All

Some one has advanced the opinion that the letter "e" is the most unfortunate letter in the English alphabet, because it is always out of cash, forever in debt, never out of danger, and in hell all the time. For some reason, he overlooked the fortunates of the letter, so we call his attention to the fact that "e" is never in war and always in peace. It is the beginning of existence, the commencement of ease and the end of trouble. Without it there would be no meat, no life and no heaven. It is the center of honesty, makes love perfect, and without it there could be no editors, devils nor news.—*Fourth Estate.*



STEEL FRAME, ST. PATRICK'S CHURCH, SAN FRANCISCO
SHEA & LOFQUIST, ARCHITECTS
Fabricated and erected by Mortensen Construction Company

Working Hours in the Architect's Office

BELIEVING that uniform practice in various architects' offices is desirable for all concerned, the Chicago Architects' Business Association recommends that the following conditions prevail in architects' offices of the State of Illinois:

1. That employees be classed as regular and special.
2. Employees classified as "regular" will be those continually engaged for a period of not less than one year, on a weekly salary basis; it is expected that such employees will assume greater responsibilities to their employers and be granted special privileges, in consideration of faithful service.
3. Employees classified as "special" will be those engaged temporarily. It is deemed proper that such employees be paid by the hour for actual services rendered, making no allowance for vacation or holidays, it being considered fair under these circumstances to allow these draughtsmen a slightly higher rate per hour than regular employees who enjoy privileges of vacations and holidays.

Office Hours

1. It is understood that draughtsmen are expected to be in their respective offices ready to begin actual work at the hours stated, and that they will continue in service at least until hours fixed for cessation of work.
2. The regular opening time of offices shall be 8.30 A. M. throughout the year.
3. Period of service for Monday, Tuesday, Wednesday, Thursday and Friday, in the morning, shall be four hours, extending to 12.30 P. M.; that the lunch hour shall be one hour extending from 12.30 P. M. to 1.30 P. M.; that the afternoon period shall be four hours, extending from 1.30 to 5.30 P. M.
4. That the Saturday period of service shall consist of four and one-half hours, extending from 8.30 A. M., continuously to 1 P. M.

Units of Service

1. One week's service will consist of 44½ hours.
2. One year's service will consist of 2,180½ hours.

Pay-Day

1. That pay-day shall be on Monday of every week.
2. That each pay-day draughtsmen be paid up to Saturday night preceding.

Holiday and Vacations

1. We recommend that regular draughtsmen be given the following holidays on full pay: New Years, Decoration Day, July 4, Labor Day, Thanksgiving and Christmas.
2. That all regular draughtsmen having been in the employ of an architect for more than one year be given two weeks' vacation on full pay, at time most convenient for employer.
3. It should be understood that "regular" draughtsmen quitting the employer's service of their own volition, preceding the completion of any year's service, shall not be entitled to a vacation.
4. "Regular" employees terminating service at the request of their employer shall be entitled to an allowance in cash proportionate to two weeks' salary allowed for vacation in the same ratio as period of service bears to one year.
5. Vacations and holidays are understood to be granted to employees for rest and recuperation, the employee being understood to be in the service of the employer during vacation and holiday time to the same extent as when regularly engaged in the office.
6. It is recognized that an average of 44½ hours per week's service is the maximum efficient service that can be continuously rendered without detriment to health or efficiency of the employee, and that where the employee engages in outside architectural service of any sort for others, he does so at the expense of his employer, and his employer should be credited for corresponding loss of time. The practice of employees of one employer working nights or holidays for another is condemned as detrimental to the best interests of both employer and employee.
7. In the case of emergencies of short duration, regular employees are expected to work over-time for the employer without extra remuneration other than a reasonable allowance for the expense of taking meals away from regular lodging place. In such cases, however, the employees will be credited with off time on account of sickness or otherwise, equivalent to the amount of over-time service rendered in cases of emergency.
8. Draughtsmen are encouraged, however, to make use of a portion of their time off for educational improvement.

Why it Takes So Long to Prepare Plans for Federal Buildings

O. WENDEROTH, the Supervising Architect of the Treasury Department, has issued the following statement, which throws light upon the seemingly slow progress which this department makes in the preparation of plans for new Federal buildings:

Many requests are received for the immediate preparation of plans, etc., for particular Federal buildings which have been authorized by existing legislation, irrespective of the date of such authorization. The following statement of the present status of public building work is issued for the information of all concerned.

Beginning with 1902 it has been the policy of Congress to authorize public buildings by what are known as "Omnibus" acts, each act including a great many separate projects. In addition, special acts are passed from time to time, providing for individual projects, increases in the limits of costs of projects previously authorized, etc. The "Omnibus" Act of 1902 was followed by similar acts in 1903, 1906, 1908, 1910 and 1913.

It is the present policy to place under contract for construction all buildings, or extensions to buildings, authorized in any one "Omnibus" act before beginning plans for projects authorized by a subsequent act. It is also the present practice to prepare the plans for all buildings, or projects, authorized in any given act in the order of the dates upon which the titles to the sites therefor were vested in the United States.

To determine the precise order in which the plans for the various buildings shall receive attention the following procedure is followed: The buildings authorized in any one act are first divided into groups according to the priority of the acts in which their sites were authorized. All buildings in each such act-group are further arranged in the order of the dates of the acquisition of their sites, the earliest date first. For instance, the 1913 act authorizes buildings upon sites which had been authorized in the act of 1908, in the act of 1910, and in the act of 1913. It is intended that the buildings so authorized in 1913 to be erected upon sites authorized in 1908 shall first be placed under contract. These will be followed by buildings authorized in 1913 to be constructed upon sites authorized in 1910. Then the buildings authorized in 1913 to be built upon sites also authorized in 1913 will take their respective turns for attention.

Extensions are usually authorized to be erected upon land already owned by the United States. While extension projects are included with the buildings authorized in a particular act, discretion is exercised in determining the order in which extensions shall be placed under contract for construction, depending upon the urgency of the need for the improvement.

The output of plans by the Supervising Architect's Office is governed by the extent of the technical force (designers, draftsmen, computers, superintendents, etc.) which the appropriations given by Congress permit the Department to employ.

At this date the Office of the Supervising Architect has on its books, waiting to be placed under contract, approximately $38,500,000 worth of authorizations for new buildings and extensions in the act of 1913. This office is placing buildings and extensions under contract at the rate of about seven million dollars annually, so that at the present rate of progress the last of the buildings authorized in the act of 1913 will not have been placed under contract until about the beginning of the calendar year 1920. It will not be until after the latter date that it will be possible for the Supervising Architect to place under contract any buildings contained in any act, or acts, which may be passed in the meantime.

The current program, made up of the remaining projects which were authorized prior to the 1913 act, includes about one year's work from this date. Work upon the plans for buildings authorized in the act of 1913 will therefore not commence until about July 1, 1915. The 1913 act contains the following authorizations:

New buildings	304
Extensions to existing buildings	23
Total projects	327

The program of work contained in the act of 1913 has not been laid out as yet. Therefore it is impossible to state even approximately the time when any building authorized in that act will be either advertised for bids or placed under contract.

If a subsequent act increases the limit of cost, or otherwise modifies prior legislation for a building or extension, before that project is reached in turn, the position of the project in the program of work is not affected thereby. If a project is set aside when its turn is reached in order to await action upon a proposed increase in the limit of cost, or for any other reason, it is taken up, whenever "released," in as near its original position as the condition of the work, generally, may render possible.

No consideration can be given to suggestions that any one project is entitled to any more consideration than another, and requests that buildings be advanced out of their order must be uniformly declined.

* * *

For the information of those not familiar with legislative terminology, it may be stated that an "authorization" is, as it implies, merely authority to acquire a site, erect a building, etc., within the limit of cost stated, and is not an actual "appropriation" of money out of the Treasury. Appropriations are made by Congress on the basis of estimates submitted by the Secretary of the Treasury. These appropriations are carried in one or the other of the annual supply acts and are intended to be only sufficient to carry forward the building program for the fiscal year to which the acts apply. "Appropriations" are made on account of the limits of cost fixed by the "authorizations" and are not extensions of these limits. All appropriations for sites, buildings, extensions, etc., are available until expended, unless repealed by act of Congress, and are not automatically returned to the Treasury if not expended before the expiration of the fiscal year.

The Public Buildings Act of 1913 authorized the Treasury Department to acquire sites, erect buildings, construct extensions, etc., aggregating a total cost of nearly $42,000,000, but did not actually appropriate one cent toward the consummation of any of these projects.

*
* *

Follow These Rules and You'll Be Happy, Maybe!

Eat less—Breathe more.
Talk less—Think more.
Ride less—Walk more.
Clothe less—Bathe more.
Worry less—Work more.
Waste less—Give more.

Preach less—Practice more.

*
* *

One Way to Get a Job

Heating Engineer—Aren't you the boy who was in here a week ago?

Bright Applicant—Yes, sir.

Engineer—I thought so. And didn't I tell you then that I wanted an older boy?

Applicant—Yes, sir; that's why I'm here now.

Efficient Waterproofing of Cement Surfaces*

By G. H. CRESSER.

THIS problem is of great interest to the architect, engineer, building contractor and owner, as it is only recently that cement and concrete have been used extensively in the construction of the modern building. With all the advantages that cement has over other materials as to economy and strength, great care must be exercised in mixing and applying it to the finished surface, to get it uniform in color. It has been proved that hollow blocks absorb moisture 4 to 5 per cent of their own weight and retain this moisture for some time. Damp walls, as we all know well, are a detriment to health, and this factor is appreciated to such an extent that it has actually retarded the use of concrete in some instances.

An argument against cement surfaces is that we do not get a uniform, pleasing color, but get varied shades of dull gray, very uninviting, that do not compare with the rich colors we find in terra cotta, granite, brick and decorated wood surfaces. There is no comparison, as cement surfaces, undecorated, give us a dreary, sometimes dirty, color that does not reflect the light, but absorbs it, and does not please the eye or appeal to the artistic temperament.

This little talk is not intended to condemn cement as a building material, but to advocate its use more than ever by improving upon what is done in that line today. If we can add to its strength, economy and fireproofing features a decorative rich color, and at the same operation make it moisture and strictly waterproof, we certainly will have a building material that cannot be duplicated the world over.

But, you will say, we have it now to a certain degree. Some makers of cement add color while making the cement. Some engineers and architects specify waterproof powder or liquid to be added to the cement while mixing. This has not been proved a success, as anything of that nature added to cement decreases its tensile strength to such an extent that it is almost unsafe. It also affects the metal used for reinforcements. You cannot get the added color on waterproofing compounds mixed uniformly, and still have your different shades, and this very often deteriorates the concrete body and leaves a bad surface for any kind of painting in the future.

The question now arises: "What is the proper way to treat cement surfaces so as to get them decorated and waterproof?" Washes, brushed on the finished surface of cement, made from waxes, gums, paraffin, etc., have been tried, but without complete success. It was now up to the paint manufacturer and painter to come to the rescue and make cement more popular and practical than ever as a material for building.

The paint maker and painter received very little encouragement from the engineer and cement maker when they first started on this problem, but finally, after years of experimenting upon all the different forms of concrete construction and under all conditions, and after a strenuous campaign of education and putting on sample jobs at enormous expense the "big ones" in the cement business and "big builders" began to sit up and take notice. They now look upon the paint makers and master painters as their best friends, as they have helped them out of many difficulties.

The first method used with paint was to first give the cement a washing with zinc sulphate and finish over this wash with a white lead and linseed oil paint, but the paint does not hold up, and it is now conceded that linseed oil paint is a failure for cement surfaces, as the alkaline salts in the cement attack and disintegrate it.

The last and most successful method and material used today, and conceded by chemists, engineers and concrete men to properly decorate and waterproof cement, is a specially prepared paint, in any shade, to be brushed on by

EDITOR'S NOTE.—Waterproofing experts will undoubtedly differ with Mr. Cresser in some of his statements. For instance, he says it has been proved that hollow blocks absorb moisture 4 to 5 per cent of their own weight and retain this moisture for some time. As a matter of fact the absorption would be nearer 15 to 20 per cent. Where the author quotes a cost estimate of 35 to 40 cents per square yard of surface painted, the figures undoubtedly apply to Eastern quotations, as the rate here does not exceed from 20 to 25 cents.

competent painters. The material contains no linseed oil or white lead and firmly adheres to the surface, filling small cracks and voids. Such a material is made by different manufacturers under various proprietary names, and requires two or three coats, which can be put on damp surfaces, but should be put on dry surfaces, and does not cover more than 200 square feet to the gallon, one coat. This material gives the dead flat finish of cement, and adds to the cost of your contract between 35 and 40 cents per square yard of surface painted. The smooth or rough surface of the cement finish has all to do with the cost of labor and material, as the stucco and rough cast surface requires more material and more brushing than the smooth trowelled surface.

Up to this point I have touched upon cement surfaces of the outside of buildings only. But we have inside walls and floors which must be decorated and made damp-proof, and floors must be made so the cement does not dust off.

Inside cement walls are either in the damp or dry class. Damp walls, especially where there is a water pressure, such as along rivers and walls that get soaked with water after heavy rains, are a problem and should, if possible, be coated on the inside and outside with a paint made from asphaltum products and decorated afterward with regular cement coating. Inside cement walls that appear dry are not such a difficult problem and can be treated the same as ordinary walls.

In connection with the damp class of walls I will say that there are on the market today several paints recommended and made to apply on damp walls.

Another class of surfaces are cement floors. We all know that when put to heavy wear they soon show defects, get slippery or throw off dust, especially where rich in cement and trowelled to a granolithic surface. Giving the floor a cement wash will not answer for factories, shipping rooms or engine rooms. The acids in the lubricating oils attack the cement and destroy its bond. The texture of cement floors and the finish vary so much that we cannot make the same specifications for all of them. They must be tested with specially prepared paint and put on by some one who has made a special study of damp-proofing and decorating cement surfaces.

* * *

The Palace of Liberal Arts at the Panama-Pacific International Exposition

THE purpose of the Panama-Pacific International Exposition is to assemble the nations of the world in a universal celebration of the completion of the Panama Canal.

The achievement commemorated is conceded to be the greatest triumph yet registered by man over unfriendly forces of nature.

As is but natural, in celebrating such an event, the Department of Liberal Arts will be given a splendid representation because it is one of the "liberal arts" that the division of human energy devoted to civil engineering is scheduled in the exposition's book of classifications.

Taking the United States census of figures relating to liberal arts for the year of 1909, approximately two billion dollars was the valuation of the gross product in liberal arts, and in but a single division of the enterprises listed as liberal arts—the graphic art section, including "typography," "books and publications" and "maps and apparatus for geography"—is involved the products of 32,414 establishments in the United States, employing 416,073 persons, earning $289,629,000 and producing an output valued at $783,477,000. The invested capital amounted to $632,590,000.

The Palace of Liberal Arts is one of the most beautiful of the eight comprising the main central group at the exposition, being one of the four surrounding the great central Court of the Universe, its south facades bordering on the wonderful avenue of palms which forms the north boundary of the

Alameda. The Palace of Education, lying to the west is separated from the Palace of Liberal Arts by the Court of Palms and the Court of the Four Seasons, and directly east is the Palace of Manufactures, between them rises the great Tower of Jewels, which reaches a height of 435 feet. The tower and adjacent palaces are to be outlined with imitation jewels—rubies, sapphires, emeralds, topazes and diamonds—gleaming by day in the light of the California sunshine and by night flashing in the rays of a battery of searchlights which will be played from Moro Castle, built on the outer arm of the yacht harbor. The construction material is the imitation Travertine Marble of which all palaces are constructed, and the main entrance and lesser doorways of this facade are of unusual beauty.

Within this palace the floor space of 241,603 square feet is devoted, one-half to American and one-half to foreign products, the exhibits being divided into fifteen groups, as follows:

1. Typography—various printing processes,
2. Books and publications—book binding,
3. Maps and apparatus for geography, cosmography, and topography,
4. Manufacture of paper,
5. Photography,
6. Instruments of precision, philosophical apparatus, coins and medals,
7. Medicine and surgery,
8. Chemical and pharmacal arts,
9. Musical instruments,
10. Theatrical appliances and equipment,
11. Electrical methods of communication,
12. Civil and military engineering,
13. Models, plans, designs for public works,
14. Architecture,
15. Architectural engineering.

In all there are 121 classes included in the fifteen groups.

Some unusual experiments are promised at this exposition. In the department devoted to instruments of precision and philosophical apparatus there will be, it is expected, from France, as well as other nations, a comprehensive display of extraordinary interest. In the American section, balances employed by butcher, baker and grocer to determine how much merchandise for a certain sum of money, to instruments susceptible to the touch of a hair, every kind of apparatus known to this age will be seen in its highest state of perfection.

The photographic art encroaches so closely upon the domain of Fine Arts that there was for some time discussion of whether the greatest photographers should not be placed in the Palace of Fine Arts.

It was decided to follow the plan of classification that obtains throughout the exposition, and to display the product along with the means of producing it. As cameras and the paraphernalia preliminary to the completed photograph belong in the department of Liberal Arts, and not in the Fine Arts, so the photographs should also be placed with Liberal Arts, thus bringing the processes and the product into proximity and proper relationship for study and comparison.

There will be set aside in the Palace of Liberal Arts a large section which will be devoted exclusively to the processes and products of photography, together with all of the equipment from which the finished picture to the commercial photographer who aims at accuracy, to the finished portrait of the art photographer who aims at beauty or self expression will be revealed.

And so in every branch of the department of Liberal Arts, of which Mr. Theodore Hardee is the chief, this account of the activities might be indefinitely extended; but the fact can be assumed succinctly and accurately in the statement that the Panama-Pacific International Exposition in its department of Liberal Arts, as in all of its other activities, promises to be the climax in the history of expositions and altogether worthy of the epochal event it will commemorate.

Varied Uses of Cement

CEMENT is now being used in practically every kind of construction work carried on, says a writer in a Chicago newspaper. Last fall a sub-committee of the Chicago Association of Commerce submitted a report showing that its investigation had disclosed the fact that cement was used in 453 articles and types of construction. Every kind of building, from a chicken coop to the modern skyscraper, is now made of cement.

A large percentage of the output is now being used in the rural districts. It has been found to be an excellent paving for roads. Farmers are using it to construct dairy buildings and silos. It has replaced wood as a material for the little rural bridges which span small streams. Drain tile also are made from it.

For purposes of ornamentation it is used for garden furniture, statues, lamp posts and fancy coping, balustrades and pergolas. Its lasting quality for structures under water has been demonstrated in the building of canals, docks and even buoys.

Chicago was a pioneer city in the use of cement. It is now one of the greatest consuming centers of the article in the country, and manufactures 8,500,000 barrels of cement each year, or more than the whole country produced in 1900. This figure probably will be surpassed in 1914. In comparison with the production of the entire country, Chicago makes 10 per cent of the whole output, which amounts to 90 000,000 barrels.

The first cement show in the country was held in Chicago. This brought thousands of builders and users of cement from all over the country, and has helped to make the Windy City the great central market for this universal building material.

New methods of using cement in reinforced concrete work are being discovered almost every day. The old method of using wooden forms to set the material is still being used, but other methods of using steel pipe and wire have been employed with success.

* * *

Code of Ethics of American Society Civil Engineers

THE following is the proposed code of ethics approved at the last annual convention of the American Society of Civil Engineers and submitted for letter ballot; it is thought the membership will adopt the code, it seemingly having met with general approval:

It shall be considered unprofessional and inconsistent with honorable and dignified bearing for any member of the American Society of Civil Engineers:

1. To act for his clients in professional matters otherwise than as a faithful agent or trustee, or to accept any remuneration other than his stated charges for services rendered his clients.
2. To attempt to injure falsely or maliciously, directly or indirectly, the professional reputation, prospects, or business, of another engineer.
3. To attempt to supplant another engineer after definite steps have been taken toward his employment.
4. To compete with another engineer for employment on the basis of professional charges, by reducing his usual charges and in this manner attempting to underbid after being informed of the charges named by another.
5. To review the work of another engineer for the same client, except with the knowledge or consent of such engineer, or unless the connection of such engineer with the work has been terminated.
6. To advertise in self-laudatory language, or in any other manner derogatory to the dignity of the profession.

As previously commented upon, this code carries with it no machinery for its enforcement or penalties for its violation, and is hence more in the nature of a "good resolution," but one which, backed by the already strong sentiment for these principles, will carry with it great moral force which alone will in large measure make it effective.

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CONCRETE STOREHOUSE STANDS SEVERE HEAT TEST

The fire-resisting qualities of reinforced concrete were demonstrated at the Salem, Mass., fire on June 25. The burned area was something more than 250 acres and the total loss was $14,000,000. Practically everything in the path of the fire was swept away except a four story reinforced concrete storehouse, the property of the Naumkeag Steam Cotton Company. This building, today as good as the day it was built, presents a striking example of the fire-resisting qualities of a well built concrete building with wire-glass windows in metal frames, reinforced on the inside by tin-clad shutters dropped by automatic fusible links and equipped throughout with automatic sprinklers.

So severely were the wire-glass windows exposed to the fire that some of the glass fused and sagged out of the frames, the exposure being 5′ distant, directly in the path of the fire. The protection afforded by the concrete walls and fire shutters sufficed to hold the fire back, so that the heat in the building was not intense enough at any time to open any of the sprinklers, set to melt at 166° F., although some of them were within 3′ of the windows. Neither was the white paint, with which the interior walls are covered, blistered. In the building were stored finished goods worth at least $200,000. Spalling of the concrete from the heat was not noticeable except in two or three very small patches.

BASIC BUILDING CODE

The American Institute of Architects, through its standing committee, presented a report on this subject prepared by a sub-committee to the Board of Directors. This report shows the importance of the preparation of a basic building code, under the direction of the A. I. A., and the co-operation of the following organizations: The American Society of Civil Engineers, American Society of Mechanical Engineers, American Institute of Electrical Engineers, American Soci-

cty of Testing Materials, the United States Government Bureau of Standards, National Fire Protection Association, National Board of Health and National Housing Association.

In regard to a definite program for the conduct of this work, it is recommended that the president of the Institute appoint a special committee of five on the Basic Building Code. This committee should be charged with the task of making a thorough investigation of the entire subject of building codes, the recommendations to be submitted to the various chapters and to be returned with their views.

AN ARTIST'S IMPRESSIONS OF THE PANAMA CANAL

A recent issue of the *American Architect* quotes Joseph Pennell, the English artist, who gives us a point of view on the Panama Canal which we seldom get, but one well worth while:

I went to Panama because I believed that in the making of the greatest work of modern time I should find my greatest inspiration.

The day I landed in Colon I found it. I had seen great cranes at Pittsburgh and Duisberg, but nothing like that which stretched its great arm, with great claws, over the sad, silent swamp of Mount Hope—the end of De Lesseps's dream. I had seen in New York, as I sat on the 30th story of the Metropolitan Building, a chain come up from below with a man clinging to it. But I had never imagined anything like the group of figures which rose out of Gatun lock at dinner time. I had looked into chasms and gulfs, but I never imagined anything so terrific as the gates of Pedro Miguel. I had seen the greatest walls of the oldest cities, but I never imagined anything so imposing as the walls of Miraflores lock. I had seen the great aqueducts and great arches of the world, but I never imagined anything like the approaches to Gatun and the spring of Pedro Miguel, made by army officers and civil engineers mainly to save material. For there are no architects, no designers, no decorators on the Panama Canal—just engineers and organizers—Goethals, Gaillard, Gorgas, Williamson, Bishop and more. But the engineers at Panama are great designers. Great work is great decoration.

Architectural Competition

The Australian Government announces an international architectural competition for the purpose of selecting the architect of the Parliament House and possibly, incidentally, an additional architect for other government structures of the new Federal Capital City, Canberra.

Only tentative outline sketch designs for the building are requested, and eight (8) prizes are offered, aggregating £6,000, the first being £2,000, in addition to commission for service at the scale of the Royal Institute of British Architects.

Designs may be submitted in either Melbourne or London before March 31, 1915, and will be judged by the following jury of architects, whose decision will be final:

George T. Poole of Australia.
John J. Burnet of London.
Victor Laloux of Paris.
Otto Wagner of Vienna.
Louis E. Sullivan of Chicago.

A program will be issued to any practicing architect on application to the High Commissioner for Australia in London, Works Departments of British Colonies, or British Embassies at Berlin, Madrid, Paris, Rome, St. Petersburg, Stockholm, Vienna, Washington, from whom also copies of text in French or German may be had on request. Copies in Esperanto may be obtained from the High Commissioner or from the Esperanto headquarters at Geneva.

Terminal at Seattle, Wash., to Cost $15,000,000

Terminals similar in many respects to the Hudson terminals of New York City are proposed for Seattle, Wash., by the Bridle Belt Railway & Navigation Co. The plan calls for an initial expenditure of $15,000,000 and an ultimate expenditure of three times that amount. As projected the first unit of the terminal will consist of two docks, each 200 by 800 feet, and four stories high; an eight-story building 500 by 500 feet in dimensions, and a 20-story 250 by 500-foot hotel and office building. The latter structure also will serve as terminal for two Canadian railways which are to be extended into the city. The terminals will be connected by a three-mile tunnel to Lake Union large enough to provide clearance for a double-track railroad. The tunnel portion of the project will cost something like $2,000,000.

It is proposed to construct the terminal near lower Pike street and the eight-story building on Railroad avenue. The 20-story structure would face on First avenue and ten stories of the building would be below the level of that street. It is stated that bonds for the entire undertaking have been underwritten and that the beginning of construction awaits only the granting of the tunnel franchise by the city and the condemnation of the necessary land. Plans have been prepared by Howells & Stokes, architects, 100 Williams street, New York City. A. P. Gillies, Henry Bldg., Seattle, Wash., is one of the prime movers in the undertaking.

With the Architects and Engineers

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(ORGANIZED 1857)

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Next Convention City—Seattle.

$15,000 Residence

Plans have been completed and work started under Architect T. Patterson Ross for a ten-room city home for George A. Armes, on the south side of Greenwich street, east of Hyde street, San Francisco, to cost about $15,000. There will be a central heating system and open fireplaces, with mantles of tile or brick. The exterior of the building will be covered with cement plaster on metal lath.

San Francisco Society of Architects

Regular Meetings Second Wednesday of Each Month

President - - - - -	John Bakewell, Jr.
Vice-President - - - -	Charles Peter Weeks
Secretary and Treasurer - - -	William Otis Raiguel
Directors - -	John Galen Howard and Louis C. Mullgardt

Committees:—

Membership—Wm. C. Hays, Fred'k H. Meyer, and Geo. W. Kelham.
Architectural Practice—John Galen Howard, Clarence R. Ward, and Houghton Sawyer.
Entertainment and Program—Louis C. Mullgardt, Chas. P. Weeks, and Louis P. Hobart.
Allied Arts—Loring P. Rixford, J. Harry Blohme, and Warren C. Perry.
Publicity—Wm. Otis Raiguel, John J. Donovan, and E. Coxhead.
Education—Bernard R. Maybeck, Arthur Brown, Jr., and John Baur.
Competitions—Chas. P. Weeks, Wm. C. Hays, and John Reid, Jr.

August Meeting San Francisco Society of Architects

The August meeting of the San Francisco Society of Architects was held at the University Club. There were twelve members and one guest present. The following resolution was unanimously passed:

The profession of architecture has suffered a grievous loss in the death of Albert Pissis, Fellow of the American Institute of Architects. He stood for the best in the great art to which his life was devoted, and of which he has long been dean in this community. Throughout an extended career and in the face of manifold difficulties he clung to those high and sound standards which alone are calculated to advance the cause of architecture and command its rightful rewards. His many achievements as an architect stand out for their dignity and beauty. As a man he was distinguished for great tenacity of purpose, gentle sincerity and charm of manner, and undeviating loyalty to his ideals and to his friends. He was a true gentleman and a true architect.

Be it therefore resolved, that the San Francisco Society of Architects hereby records the deep and sincere grief of all its members for the loss of their beloved comrade and standard bearer.

Be it further resolved, that our sympathy is hereby cordially extended to Mrs. Pissis, family and friends.

* * *

The Committee on Education reported that the San Francisco students who were at the Ecole des Beaux Arts in Paris at the opening of the European war were all on their way home. Mr. Harrison passed his entrance examinations to the school second on the entire list. Since that time he has been taken quite seriously ill and it is feared that an operation will be necessary.

A committee was appionted by the President with power to act to draft resolutions requesting the Secretary of the Interior to take steps to bring the artistic development of the National Parks under the jurisdiction of the National Committee of Fine Arts.

The subject for the September meeting will be "The Development of the Foot of Market Street."

Granted Certificates to Practice

The following have recently been granted certificates to practice architecture in this State by the California State Board of Architecture, Northern District:

Ralph Wyckoff, Oakland.
Albert L. Lapachet, San Francisco.
Roland Irving Stringham, Berkeley.
Walter J. Long, Sacramento.
Oberl F. Simpson, Alameda.
Earle B. Bertz, San Francisco.
Clarkson Swain, San Francisco.
Bunshiro Ito, San Francisco.

Temporary certificates were granted to William Gray Purcell and George G. Elmslie of Minneapolis for residence to be erected for T. L. Waller of Berkeley.

Oakland Scientists to Build

Preliminary plans have been made by Architect William A. Newman of San Francisco for a brick and steel church building for the Christian Science Church of Oakland. It will be erected at Thirty-fourth street near Telegraph avenue, and will cost $75,000. There will be a large auditorium, reading room and lecture rooms. The exterior of the building will be faced with pressed brick.

Architect Denied Lien

Judge Shenk of the Superior Court, in a decision handed down last week, denied the right of Architect Charles Gordon to enforce a claim of a mechanic's lien against a property for architectural services in preparing plans for a building which was not built. The decision, which was in accordance with previous rulings on similar cases, holds that before a claim for architectural services can come within the scope of the mechanics' lien law, construction work must be started and actual service rendered upon the property. In case work is not started, the architect has redress through civil procedure to collect his account, the same as any bill is collected.

The decision was rendered in the suit of Architect Gordon against Verne H. Carter, Katherine Dillon Winship and A. O. Stewart for $4,150 as architect's fees. Mr. Carter had a contract to purchase the property on the east side of Spring street adjoining the American Bank Building at Second and Spring streets, Los Angeles, and authorized the architect to prepare plans and specifications for a 12-story hotel building to cost $250,000, to be erected on the site. The contract to purchase the property was not carried out and, therefore, the hotel was not started.

Oakland Office Building and Theater

Architects Righetti & Headman of San Francisco have prepared plans for a 12-story class A office building and theater for the Turner & Dahnkin interests. The site is the lot previously occupied by the First Presbyterian Church at Fourteenth and Webster streets, Oakland.

The theater will be one of the largest and finest in the west, with a seating capacity of about 1,600. The latest appliances in ventilation and heating will be installed, while large lounging and smoking rooms are included in the plans.

$35,000 Apartment House

Plans have been prepared by Architects Fabre and Bearwald of San Francisco for a $35,000 apartment house to be erected on the south side of Clay street east of Franklin street, for Mrs. Cohn. The building will contain six large apartments of six rooms each with interior finish of pine, white enamel and hardwood. There will be open-air sleeping porches for each apartment. The exterior of the building will be covered with cement plaster in imitation of cut stone and a stone veneer base.

Home for the Aged Germans

Architect Oscar Haupt of San Francisco has completed working drawings for a group of two and three-story buildings to be built at the German Altenheim, Oakland, at an estimated cost of $50,000. Construction will be of brick, concrete and frame.

Urges National Type of American Architecture

William Hunt Diedrich, a young American sculptor, who has won fame in Paris after six years of work in comparative obscurity, says:

I have a number of commissions on hand now, but as soon as possible I intend to return to America. Being an American, I consider that whatever ability I have should be devoted to work in America.

Although I have devoted much time to sculpture, the kind of work which attracts me most is architectural decoration, and that is what I intend to do chiefly in America.

American architecture should be more emancipated. I have nothing to say against steel work and skyscrapers, for they are the natural outcome of the national requirements, but in almost every other respect American architecture is laboring under European traditions completely out of keeping with the American temperament. A Greek temple would look ridiculous in a country of pine trees.

America should develop a national style of architecture, inspired by American nature, as the Gothic and old Norman styles were suggested by the conditions of the countries and the temperament of the people who created them. The Southern States require a much more exotic style of architecture than they have at the present day.

Riverbank People Wanted Too Much for Their Money

The residents of Riverbank, California, held an indignation meeting because the architect of their new school house was unable to build them a $10,000 structure for $7,000. But it appears to have been no fault of the architect, J. W. Woollett, who simply eliminated certain attractive features of his plan because the district was shy of funds. It seems $2,000 was paid for the site and other sums were spent for attorneys' fees and advertising. The bond issue was for $10,000, and with these unlooked-for expenses it left only about $7,000 to build the school with. The present building is the same as originally planned with the exception of the two towers, the tiled roof and the arches along the cloister. The residents have absolved the architect of all blame in the matter.

$500,000 Federal Building

Officials of the Panama-Pacific International Exposition have received notification from the government at Washington that all United States government exhibits will be shown in the $500,000 government building. The available space in other exhibit palaces has been greatly oversubscribed and this will relieve the congestion for the exposition palaces.

Keeps the Architects Posted

Publishers The Architect and Engineer, San Francisco:

Your magazine keeps the architects of the Pacific Coast well in touch with the work that is being done.

S. TILDEN NORTON,
Member of Board of Directors of Southern California Chapter, A. I. A.

Exposition Concession Work

Many San Francisco architects are busy designing mercantile and manufacturing concessions for the Panama-Pacific Exposition.

Architect L. B. Dutton has prepared plans for an elaborate farm exhibit for the Holt Manufacturing Company of Stockton.

Architect Arthur G. Scholtz is drawing plans for an elaborate concession for the California Wine Association.

Architect Sidney B. Newsome has made drawings for a bungalow and garden for the General Electric Company.

Architect Smith O'Brien will design a suitable structure for the Workman Packing Company.

Architect Mathew O'Brien is preparing plans for an elaborate concession and Architects Garden & Kuhn have prepared plans for a manufacturing plant for the Sperry Flour Company.

Architect Charles Paff & Co. have designed a $20,000 frame and plaster building for the Marine Garden Cafe Company.

Personal

Architect John J. Frauenfelder, formerly connected with Architects Parkinson & Bergstrom of Los Angeles, has opened an office at 1116 Story building.

Mott Montgomery of the architectural firm of Montgomery & Montgomery of Los Angeles, and Edna Kathryn Reed of Toledo, Ohio, were married recently at Ft. Ward, Washington. The couple are residing at 2312 La Salle avenue, Los Angeles.

Walter E. Pinkham, head draftsman for Bakewell & Brown, architects of the new San Francisco City Hall, was married August 19th to Miss Blanche Hawk, daughter of Mr. and Mrs. Elbridge L. Hawk of San Francisco. The couple are making their home at 587 Frederick street, San Francisco.

Architect Lansburgh Busy

Architect G. A. Lansburgh of San Francisco is busy. He has completed plans for an elaborate addition to the Concordia Club building at Van Ness avenue and Post street, San Francisco, to include a gymnasium, swimming tank, etc. Mr. Lansburgh has also made plans for a $16,000 residence at Webster street and Broadway, San Francisco, for Samuel Lowenstein. A contract has been let for an attractive concession at the Panama-Pacific Exposition for the Orange Blossom.

Busy on Residence Work

Architect C. C. Cantin, of San Francisco, is among the busiest architects in San Francisco just now. He has just completed a $9,500 residence at Forest Hill for F. C. Van Schaick. The style is Italian Renaissance. Plans have also been completed for an attractive city house to be built on Larkin street, near Lombard, for H. G. Jenkins, at a cost of $7,500; also a house in the Sunset District for Mrs. Lillie Schroeder, and a handsome country home at St. Helena for M. Cole, a wealthy ranch owner of Napa county.

Architects in New Offices

Architects Willis Polk & Company have moved from the Merchants Exchange building to the new Hobart building, San Francisco.

Architect William Wilde, of Oakland, announces the removal of his office from the Albany block to 1725 Broadway, Oakland.

Architect O. R. Thayer has moved from the Merchants National Bank building to 20 Montgomery street, San Francisco.

The Architect and Engineer will shortly publish a new Directory of Architects and Engineers on the Pacific Coast. There have been a great many changes since the last directory was issued.

Bank Addition and New Residence

Architect Clinton Day of San Francisco has prepared plans for a stone addition to the Bank of Dunsmuir. Mr. Day is preparing plans for an attractive residence to be built in Piedmont for Mrs. T. L. Barker. It will cost approximately $18,000. Sketches have been made by the same architect for a stone and brass sun dial for the University of California campus.

Honor for Architect Hobart

Architect Louis P. Hobart of San Francisco has been honored by the selection of his competitive plans for the new million-dollar Postoffice building at Portland, Oregon. Architects invited by the Treasury Department, from various cities east and west, participated in the competition. The design is in the classic and calls for a three-story structure of steel and stone.

Five-Story Building

Architect Henry Shermund, Mills building, San Francisco, has prepared plans for an attractive five-story class B hotel building to be erected for J. D. Costigan at Jessie and Fourth streets, San Francisco. There will be a steel frame, reinforced brick walls, steam heat with oil burning plant, hardwood lobby, automatic elevator, etc.

Addition to Bath House

Architects Reid Bros. of San Francisco have prepared plans for a substantial addition to the Olympic Salt Water Company's baths on Bush street, San Francisco. The addition will be devoted largely to Turkish baths and will be a three-story reinforced concrete structure costing approximately $40,000.

Won Elks' Building Competition

Architect E. F. Champney of Seattle has been selected to design the new Elks' building at Tacoma, Washington. There were fifteen architects in the competition. The building will cost $100,000.

Heating and Lighting

Plumbing and Electrical Work

The Science and Art of Illumination

THE words "Illuminating Engineering," or "Lighting Engineering," first made their appearance in public print fourteen years ago, but it was not until seven years after this that the phrase began to gain general currency with the organization of the Illuminating Engineering Society.

For the first year or two of its life the parents of the child seemed to be mostly concerned in finding out whether it was boy or girl. They knew they were nursing an infant named Illuminating Engineer, but what was illuminating engineering? Some said: "It is the science of reflectors. Others said: "It is the science of prism glass." And still rather numerous others said: "It is no science at all; it is a method of selling goods."

In the face of these doubts as to its legitimacy the architectural profession hesitated to receive the new-born scientist as a peer,—to the no small discomfiture of its fond parents. Meanwhile the fledgling began to express itself, and its prattle was not always complimentary to the existing methods of lighting designed by the wary architects. An unfeeling public, however, not infrequently applauded the criticisms; there was no doubt that some of the lighting was pretty bad. As the infant began to grow in stature and knowledge it began to acquire more reserve in its statements. In the course of events the architectural profession came to have something of the feeling toward this young profession that there is between the college senior and the freshman,—a recognition of the fact that the youngster really has something in him and may yet develop into a creditable colleague.

If the young illuminating engineer exaggerated the importance of his own profession in the enthusiasm of discovery he is not entirely without precedent among his older confreres. It is an entirely natural, and generally fortunate trait of human nature for the individual to magnify the importance of his own labor. If there were not a considerable number who enjoy sitting on the hub of the chariot wheel, like the fly in the fable, it is quite possible that humanity would have no chariots at all. At any rate, there is no denying the fundamental postulate of the illuminating engineers, namely; that the subject of artificial lighting in this 20th century is one of the very highest importance.

There is perhaps no single development in science in the production of so-called modern conveniences that has had so great an influence upon the development of architecture as the improvements in the ways and means of producing artificial light. The great masterpieces of ancient architecture were essentially one-story buildings. Some of the largest were not even covered with a roof, and they were never in any case overshadowed by surrounding structures. The typical building of today, which makes even the tallest of the world-famed cathedrals look like pigmies and shelters more people than many a walled city of ancient times, has been made practical solely by the use of modern means of artificial illumination.

The effect of this new type of structure upon the Art of Building, or Architecture, can be best appreciated by those following this ancient and honorable vocation. To be sure, artificial light has nothing to do with modern materials of construction, which have made our skyscrapers and monumental buildings *possible*, but it has made them *practical* by furnishing the absolutely essential facility of light in every part of them at all times. Illuminating engineers therefore have scarcely exaggerated the importance of the subject matter of their profession for the sufficient reason that it was impossible to do so in sober phrase. The importance of the subject is certainly sufficient to secure for it most respectful attention, and at least some of this respect should reflect upon those who are devoting the whole or the best part of their time to its serious consideration.

But admitting the importance of artificial light in a building is not admitting that the matter of securing it involves a sufficient range of knowledge to entitle it to a place among the different branches of engineering. It is equally important that buildings have windows, but window engineering does not follow as a necessary result of this fact. Is the artificial lighting of a building only one of the numerous details connected with its construction which it is the architect's business to handle? Or does it necessitate such an extended knowledge of scientific laws and their practical

application that the architect may properly refer the subject to a specialist,—as the general medical practitioner refers, for example, eye cases to the oculist? This was one of the questions upon which there was the widest divergence of opinion at the beginning. Laying out the light of a building always *had* been attended to by the architect, and with many people the fact that the thing always has been is a perfectly conclusive reason why it should always continue to be.

The second point of contention was, whether the use of artificial light depends upon the application of exact physical laws and measurement to an extent to justify placing it among engineering problems, or does it depend upon that exercise of judgment and taste that places it rather in the domain of craftsmanship and applied art? In short, is lighting a Science, or an Art?

It is related that when "The Lady or the Tiger" was the latest question in literature, a friend of Mr. Stockton's conceived the idea of getting his own answer to the question by presenting him at a dinner to which he had been invited two ices, one molded in the form of a lady and the other in the form of a tiger. Mr. Stockton, on being asked which he would take, promptly replied: "Both, if you please." And so the puzzle remains unsolved to this day. On the question of whether lighting is a Science or an Art we are ready to reply with equal promptness: "Both." We believe that any attempt to rigidly include the subject in one category to the exclusion of the other is illogical and detrimental; and it will be our purpose in the present discussion to show wherein the subject pertains to both of these divisions of knowledge, and how the ends desired may be best obtained by complete and hearty co-operation between scientist, artisan, and artist.

The objects sought by the use of artificial light are:

(1). To enable the eye to see certain objects with distinctness and ease.

(2). To show the beauty of objects and surroundings in *ensemble*, either unimpaired or enhanced.

The relative importance of these two subjects depends upon the conditions of the installation; in some cases one and in some cases the other of them can be wholly neglected, but in the majority of cases some measure of each is desirable. It is evident that the relative importance of these two objects measures the extent to which science and art enter into any particular lighting problem.

The securing of these objects requires a knowledge of the following subjects:

(1). Sources of light.

(2). Fixtures, or means of supporting the light-source.

(3). Accessories, or means of modifying and directing the light from the sources.

(4). Character and arrangement of the objects illuminated.

(5). Effect of light upon the eye.

(6). Appearance of fixtures.

(7). Esthetic and psychological effects of light.

Some amplification of the above subjects is necessary to a clear understanding of the classification. The sources of light are derived chiefly from two illuminants, gas and electricity. The use of candles and oil lamps does not involve sufficiently complicated conditions to give them a place in the science and art of lighting. Gas furnishes two different light-sources, the flame burner and the mantle lamp; of the latter there are two kinds, inverted and upright, and each of these again includes single and multiple-mantle lamps, furnishing a range of candle-power* from 20 to 3000. Electricity furnishes three different light-sources, the arc, the incandescent and the luminous vapor lamp. The arc has three varieties, carbon, flaming and luminous; the incandescent two varieties, tungsten and carbon filament; and the luminous vapor two varieties, the Cooper Hewitt, or mercury vapor lamp, and the Moore light, or vacuum tube.

In fixtures we include all the means within the building necessary for producing light from the illuminant supplied. In the case of gas this will include piping, lighting fixtures in the ordinary sense of the term, and the means of lighting and extinguishing the lamps. In the case of electricity it includes wiring and the arrangement of switches as well as the fixtures for supporting the lamps and accessories. The question of fixtures thus covers three different trades, gas-fitting, electric wiring, and fixture manufacture.

Accessories include all of the means of redirecting and modifying the light from the sources so as to produce the desired illumination. They may be conveniently divided into reflecting and transmitting, or in common terms, reflectors and globes. Reflectors again may be divided into translucent and opaque, in each class of which there are a number of varieties. Globes have no particular line of subdivision, but include a great number of different varieties. The whole subject of accessories has been enormously elaborated within the past 10 years and the different varieties which it includes runs into the thousands. Since modern light-sources require in practically all cases some form of accessory this is one of the most important of the general divisions in the whole science and art of illumination.

The character and arrangement of the objects illuminated may be divided for most purposes somewhat as follows: residences, factories and workrooms, stores, auditoriums, public halls, and exteriors. Any room intended for living purposes would be naturally included in residences. Auditoriums include every kind of room in which public performances take place, as churches, theatres, etc. Public halls include all dining rooms, ball rooms and the like, while work rooms include offices, school rooms, libraries and all other places where mental or manual work is performed.

* The word candle-power is here used in the same sense that it is used by the manufacturers in rating their lamps, which is usually the maximum candle-power of the rays.

[*Concluded in the October Architect and Engineer*]

The Editor's Mail

Questions on Any Branch of the Building Industry Will Be Answered Here

More About Roofing and Roofing Materials

To the Editor:

In reading your answer to an inquiry concerning a suitable roof for concrete houses, in the August ARCHITECT AND ENGINEER, I was surprised to see no mention of Ru-ber-oid, a material that has been used for years with splendid success. It is not my desire to advertise this particular make of roofing, but merely to call attention to your oversight. Do you not consider it in a class with the other types of roofing materials you mentioned?

A LOS ANGELES CONTRACTOR.

When we undertook to answer an inquiry as to the use of concrete roofs for residences and their method of construction, we dismissed the subject by stating that there were very few, if any, concrete roofs built in California, except where the building itself was of reinforced concrete. The average residence is of frame construction and therefore a concrete roof would be too heavy for an ordinary wood frame support. In stating that there is no better roof than cedar or redwood shingles we had in mind the gable structure and when we spoke of tar and gravel we had in mind the various compositions, such as Malthoid, Ruberoid, asphalt, and a dozen different makes—any one of which would be serviceable and applicable to a flat roof but did not appeal to us or seem practicable for pitched roofs. We have since learned, however, that Ruberoid roofing, in various colors, may be applied to a gable roof as readily as a flat roof. Its manufacturers state it was the original prepared finished surface roofing on the market. Elsewhere in this issue attention is called to some recent installations of Ruberoid and Malthoid in the southern part of California. It is probably not necessary to mention here that this roofing is the product of the Paraffine Paint Company and is in use on buildings scattered in nearly every city and town of consequence throughout the world.

How to Remove Iron Rust from Stucco

TO THE EDITOR:

How can I remove surface discoloration of my stucco house, caused by iron rust and leakage from the redwood boards. OWNER.

A writer in *Concrete Age* recently offered the following remedy:

"A solution of hydrochloric acid and stannous acid will remove iron rust from concrete, and will not injure the concrete if the treatment is administered rapidly and the face immediately washed with clean water. The solution mentioned has an affinity for carbonate of lime, consequently it should not be used where hydrated lime has been incorporated in the mixture. Rough finished cement stucco should be treated by spraying with the above solution as the result will be more thorough and the work more rapid than by the use of a brush.

"Very satisfactory results may also be obtained by diluting one of the commercial cement paints until it is thin enough to use in a spray pump, and painting the surface of the stucco by spraying the diluted paint upon it."

Hunt & Grey Were the Architects

TO THE EDITOR:

The attached letter, referring to the article on California School Architecture in the August Architect and Engineer, is self-explanatory:

August, 18, 1914.

MR. EDWARD L. HYATT,
Sacramento, Calif.

My dear Mr. Hyatt:—My former partner, Mr. Elmer Grey, has called my attention to an article in the Architect and Engineer of California, showing an open-air school room, of which I furnished you, through Miss Pease, the principal of the Polytechnic Elementary School in Pasadena, the drawings.

Through one of those errors which are unavoidable my former partner's name seems to have been put on these drawings, instead of mine, very much to his distress. If they are published again, I know that you will see that the credit is given to me.

It would seem from the text that they must have gotten the material from you. That is why I am writing you this note.

Sincerely yours,

M. HUNT.

Used Square Twisted Bars Instead of Round Ones

The following dispatch appeared in the *Sacramento Bee:*

PLACERVILLE (El Dorado Co.), August 14.—The steel that was to be used in the construction of the new Webber Creek bridge on the State road has been condemned by Clifford B. Rushmer, Superintendent of Construction, acting in the interests of the county.

According to the original specifications the plans called for 7-16 steel, but it is claimed this was substituted for the inferior size of ⅜.

The original contractors were Jenkins & Wells of Sacramento, but they sub-let the contract to the Industrial Engineering Company, which in turn sub-let the contract to the Edward L. Soule Company of San Francisco.

Answering the above Mr. Soule writes *The Architect and Engineer* as follows:

In order that the facts may be laid clearly before you, we might state that the substitution of square bars was made in place of the rounds as shown on the plans. This substitution was accepted by the contractors, a copy of which acceptance we have in our office, but the change was not taken up by the people who made the plans with the representative of the county. It would therefore be illegal to make any changes that were not authorized by the Board of Supervisors or their representative.

You can therefore see when this changed plan came on the works, they were totally ignorant of the facts. For example: The original plans called

for 11 7/16" bars per belt, which equals 1.653 square inches of steel. The amount of material which we have sent up is 13 ⅜" square bars, which equals 1.82 square inches. The Supervisors simply saw the size of the bars, 7/16", without noting that they were rounds or squares or taking into account the areas and elastic limits of the square twisted bar in comparison of that of the rounds.

From the above you can readily understand that it is not a matter of attempting to skimp the design, but simply a technicality on the part of the people who prepared the plans to neglect to take up with the Board the change from round bars to square twisted.

Yours very truly,
Eow. L. Soule Co.,
By Eow. L. Soule.

P. S This is in no way up to us.

Success Through Concentration*

By JOHN H. SCHUMANN.

A MERCHANT died in this city a short time ago leaving an estate which figured in the tens of millions. One of our best newspapers, commenting on this man's life, stated:

"In the report of the appraisal on the estate of Benjamin Altman, one fact stands prominent and significant—the way in which this wonderfully successful merchant concentrated all of his attention and ability as a business man on a single object. That object was his own store, the structure of his own creation, with every phase of which he had full and personal knowledge."

It is on this "Success due to concentration" that I wish to speak to you briefly, to point out how your success and the success of the Moller & Schumann Co. depend entirely on how we, one and all, concentrate our efforts to learn all we can about our varnishes, enamels, and japans; their use; the results to be obtained; and how to sell more of them.

To be successful in selling our goods, you must first of all have complete confidence in them and in us. This confidence you can only gain by close association and study of our goods, our methods, and ourselves. You must, in other words, establish that intimate relation which brings absolute confidence in the Moller & Schumann Co. and their products. Without this confidence you cannot be in full sympathy, nor can you do yourself justice and work in harmony with us.

I believe that everyone of you has absolute confidence in this house. As to our goods and our policies, there is always much for you to learn because we are continually striving to keep our business methods in line with the tested and accepted methods of the most successful concerns, and we are always studying how to improve our varnishes and give the greatest possible quality for the money.

You have a fair knowledge of varnishes, their possibilities and limitations. Do you know all there is to know about them? All my life I have been identified with this company, and I must confess that my knowledge of our products, their application and use, is increasing today more and more than ever before. Today we not only have every safeguard to make our goods correct according to a proven formula, as has always been done in the past, but we go much further. Today our products are put to practical tests in the finishing department, duplicating the various processes to which these goods are subjected by our customers, and proving to ourselves that the goods used in that particular manner will give exactly the results which the customer expects of them.

You can appreciate the great value knowledge thus acquired will be to you. Just such knowledge we are giving you every day in our correspondence, and will give you in far greater measure during the next few days.

You remember that "feeling of satisfaction" which comes to you after you have settled a varnish question by giving your customer the desired information, thereby improving a valuable opportunity of coming in closer business friendship with him. Then, too, you may remember some occasion where you try to "bluff it out," or even had to confess that you did not know but would put it up to the house. *Your success will increase* in just that measure with which you *increase the number of times* you have the satisfaction of giving the customer the necessary information, and *make less and less seldom* the occasions when you are compelled to refer to the house for the last word.

The good impression created when you show a customer just how the goods should be used, or possibly prove to him the cause of some trouble he is having, goes a long way towards bringing that business to you, and the house gets credit for having salesmen "who know their goods."

When you stand firmly for what you know to be right and do not yield to any "strike" claim of your customer, when you show him that you are ready to live up to our agreements in all fairness and expect him to do the same, you rise in that customer's esteem and he makes a mental note that you not only "know your business" but have backbone enough to stick to your point.

Much that you learn in regard to varnish we cannot give you here, you must get it by close observation and careful attention while with your customers. It may be in conversation that you obtain a valuable point, or it may be by using your eyes while going through the factory of a prospect. Often a point of the greatest value to you may be learned from some finisher, or perhaps a dealer. Cultivate their friendship by all means, let them see that you are interested in *their* problems, for by being truly interested and trying to help them, you will gain much that is valuable.

* Paper read to the selling staff of the Moller & Schumann Co., well-known varnish specialty manufacturers.

Relative Value of Stone and Concrete Curbs

By SAMUEL H. DOLBEAR.*

IT WOULD appear from the great variety of curbs which have been installed in various cities, that either the importance of the curb function is not appreciated, or that a wide diversity of opinion exists among engineers as to the respective merits of one curbing or another. Probably both of these factors play a varying percentage in the result. What city has not its dirt parkings—curbing of redwood boards—stone, plain concrete, and concrete armored with angle iron, strap iron and other devices?

In San Francisco two types are in general use, namely, granite and cement concrete, protected by a single-piece type steel curb bar.

In the district bounded by, and in a general way east of, the easterly side of the Presidio and extending south on Lyon street to Eighteenth street, thence to Indiana, south to Fifth avenue south, and to the water front near India Basin, only granite curbs may be used under the terms of the specifications adopted. Outside of this boundary, the determination of the type of curb to be used has been left largely to the City Engineer's office. The elimination of all curbs except granite, in this zone, is ostensibly done for two reasons: One is—as City Engineer O'Shaughnessy stated recently to the writer,—to preserve a uniform appearance in the streets; the other is based upon the assumption that granite curbs are more lasting and better adapted to severe usage than any other curb.

Let us see if granite or stone curbing has rendered the service for which it has been given credit. I am told that the stone curbs of San Francisco cannot be taken as a representative example, as many of them were damaged by the fire of 1906 and have not been renewed. I submit that the stone curbs in every city in the United States are in very much the same condition. Furthermore, granite curbing which has been quarried and installed in San Francisco since 1906 is now broken, spalled and worn in many places, hundreds of places, in fact. I recently inspected a very remarkable example of the effect of traffic on stone curbing in the city of New York. On the street I mention (one of the busy ones) the heaviest stone curb had been installed. This curb, which I am informed was originally a twenty-inch stone, was worn down to a mere shell, slightly more than two inches in thickness.

Curbs at the intersection of streets necessarily receive the hardest usage. At these points the inefficiency of stone becomes particularly apparent, so much so, in fact, that in many cities a tacit admission of the superiority of steel-bound curbs over those of stone is made by providing a metal protected cement concrete curb at the corner, while the remainder of the curb is stone.

Stone is brittle in one degree or another, and may be broken into pieces by a comparatively slight effort. I suppose we would not have our chain gang doing this if such were not the case. If one were to pound the edge of a San Francisco granite curb with a four-pound hammer for a day, his labor would be rewarded with quite a pile of broken stone. Let him hammer twice as long on the steel armor of a properly constructed concrete curb, and he would have nothing for his pains. The reasons for this are so readily apparent that they require no elucidation. The example is cited—inasmuch as it represents quite clearly, from a mechanical point of view, what may be reasonably expected and what actually does occur when a heavily laden truck strikes the curb edge. It is not necessary to search for specific examples of this result, as they are too readily apparent to even a casual or untechnical observer.

Although these facts have generally been known and the seriousness of these faults more or less appreciated, stone curbing has continued to be used in a large way for want of something better.

It seems very remarkable that it has taken so long to evolve a type of curb not open to these objections, inasmuch as such radical departures and improvements have been made in other details pertaining to street construction.

It is true that efforts have been directed along these lines by various people as far back as 1869 when Coignet conceived the scheme of placing angle iron on the curb edge. This was the initial step in the right direction, and while it corrected one curb malady by preventing the edges from the crumbling or powdering effect of abrasion from wagon tires dragging along the edge, the principle was faulty, inasmuch as the surface of the concrete immediately behind the angle iron was soon shattered by the impact of wagon wheels, resulting, first in the loosening of the bar, and, finally, in the practical destruction of the curb. Another weak point in Coignet's scheme lay in his method of securing the armor to the curb. Anchor bolts were provided at intervals, the heads of the bolts being usually countersunk to provide a flush surface. As the heads of these bolts penetrated the surface of the bar, the corrosion of a very small amount of metal soon resulted in the bar becoming loose. Still another fatal result was produced on account of this intermittent type of anchorage. The expansion of the steel between two of these

* President American Steel Bar Mfg. Co., Merchants Exchange Bldg., San Francisco.

anchor bolts exerted great pressure on the bolts, and the slight movement of the bolts soon resulted in the development of cracks in the curb running directly parallel with the bolts. These objections apply in every instance to the flat strap iron similarly bolted into the curb, which has found such wide use in the cities of Oakland and Berkeley.

We have, then, two principles to avoid in armoring concrete curbs: That of intermittent anchorage, and that in which we expect the surface of the concrete directly beneath the armor to carry the full shock of impact without crumbling. It is essential then that a curb armor of the right type must have a sufficient and continuous anchorage and should be constructed in such a way that when the blow is struck the stresses shall be transmitted into the core of the curb and distributed over a relatively wide surface.

Many men of many minds produce a curious Bedlam of results. One of these is a curb bar constructed after the fashion of a wedge. If it were the sinister purpose of a curb bar to destroy the curb, it would be hard to conceive a more effective tool. That the three card monte man may continue to bank on the gullibility of mankind, is evidenced by the fact that millions of feet of this device are said to have been used and more is being installed from time to time. It has been my misfortune to hear men—including engineers—who appear to be mentally competent in most matters, dispute this. The layman may be excused for his lack of information, but the engineer should be expected to know the definition of a wedge, inasmuch as it is one of the primary class principles taught in the study of mechanics.

Let us approach the subject from another point of view, for inasmuch as it is the property owner who must directly or indirectly pay for the curb, the subject of cost is one which must be given most serious consideration. No property owner is going to consent to the purchase of the most expensive article of any description unless he be convinced that he is receiving something of greater value for his money. In curbing, the most expensive construction is that of stone, costing in San Francisco from $1 to $1.85 per lineal foot. This is the price which you are called upon to pay for an article which must sooner or later become inefficient and unsightly.

A curb of cement concrete protected by the proper type of steel armor may be installed in San Francisco at from 65c. to 85c. per foot. San Francisco property owners are paying, therefore, as high as $1.20 per foot more than they should for the perpetuation of an antiquated idea, and are receiving for their money a curb which is confessedly distinguished by its excessive cost and fatal imperfections.

The costs above given will be found to vary in cities where the labor and material conditions are different, but the ratio will remain very much the same.

City engineers, in planning improvements of any character, have, of course, two things to consider—that which is the most efficient for the purpose, and that which the public demands. The burdens of all public officials would be greatly lessened if some satisfactory method could be devised to induce the public to voluntarily make their wishes known.

Public improvements would be particularly aided if those interested would do this in the first place, instead of protesting after the working scheme has been formulated and put under way. At the same time, the burden of responsibility cannot be entirely left to the property owner in the case of street improvements, for it is the part of the officials supervising such work to keep informed in matters of this kind and to provide such improvements as will be of lasting benefit to the public and to those who must bear the financial burdens of the improvements.

Change in Denison Block Management

Mr. D. A. Cannon, of Sacramento, has taken over from the California Denison Block company the central and northern California territory with the rights to manufacture and sell Denison Interlocking Tile Blocks, under the name of the Denison Block Company.

Mr. Cannon's principal place of business is Sacramento, and besides manufacturing and selling Denison Interlocking Tile Blocks will handle the entire output of the Sacramento Clay Products Company.

Mr. Cannon was formerly Canadian sales manager for the Royal Typewriter Company and was with the California Denison Block Company as salesman and later as manager for northern California.

A. P. Merrill, a graduate of Massachusetts Institute of Technology and an architect and superintendent of fourteen years' experience, has been retained as superintendent of construction.

V. S. Persons, civil engineer, will act as consulting engineer for the new company.

J. B. Phillips, a man of many years' experience in the clay industry and who is widely known as an authority in his line, is manufacturing superintendent and has charge of the plant.

The Denison Block Company is shipping its products to many points in northern and central California and has recently constructed the Corcoran High School, Ceres High School, Almond warehouses in Fair Oaks, Lodi and Sacramento, and numbers among its other contracts the five-story addition to the Forum building, and the Fruit Exchange building, Sacramento, besides numerous pieces of residence work.

State, County and Municipal Engineering
Good Roads—Water—Sewers
—Bridges—Fire Protection

Hydrated Lime in Concrete Road Surfaces*

By ROBERT S. EDWARDS.

THE general conditions under which concrete pavements are placed are severe, as the majority of work is usually done in the dry spring and summer months when temperatures are high, causing excessive evaporation. The concrete is generally poured on an earth or clay sub-base in a thin slab varying between 4 inches and 7 inches in thickness. This condition alone makes it almost impossible to secure uniformity throughout the concrete mass, so that after hardening the concrete road slab is subject to far greater variation, due to the segregation of the coarse aggregate from the mortar, than is found in other forms of concrete work. This, of necessity, causes unevenness throughout the concrete, and the excessive cracking and unravelling so often seen in poorly laid concrete roads is directly due to this fact.

It is the writer's opinion that the primary cause of cracking in concrete pavements is due to the loss or leakage of varying portions of the mixing water from the concrete by seepage through the sub-base, as well as by evaporation from the surface of the concrete, which leaves the concrete road slab in such a condition that at later times it will alternately absorb and give up water, depending on the season of the year, and that expansion and contraction of concrete and any movement in its volume are due infinitely more to this alternate wet and dry condition than to any temperature change from hot to cold without presence of moisture.

That the cracking which is directly attributed to the change in the condition of the sub-base, either in settlement spots or in drying out in shrinking, is primarily due to this cause, which is greatly helped by unevenness and variability of the concrete mixture.

That there are extremely few, if any, concrete pavements, individual slabs of which can be considered entirely uniform.

The Use of Hydrated Lime.—Hydrated lime is a product formed by the addition of accurate quantities of water to known weights of freshly burned quicklime, the finished material being a flour-like powder of great fineness and covering capacity, having more than twice the volume of the same weight of cement in its dry state.

The use of hydrated lime as a void filler in concrete mixtures, and for rendering concrete mixtures more water-tight, dates back several years. Numerous tests show that a replacement of from 10 to 15 per cent of cement by hydrated lime in rich concrete mixtures does not decrease the compressive strength of the concrete after three to four months' time, and ultimately increases the strength and permanence of the concrete. It apparently makes but little difference as to its action as a void filler, whether the hydrate is manufactured from a dolomitic or high magnesia lime or a high calcium lime—it being necessary only to have a product which contains no free lime or unslacked particles. The proper hydration or dry slacking of lime reduces it to a finer degree of subdivision than can be accomplished by any mechanical means.

The amount of water required to convert the dry hydrated lime into a plastic paste varies from 50 to 70 per cent of the weight of the lime; while, to obtain a mortar of similar consistency with Portland cement, an addition of 25 to 30 per cent of water is required.

Unlike Portland cement, however, the addition of water to hydrated lime does not create any chemical reactions. There is simply a lime paste formed which holds its excess water for a long time. Upon the addition of small quantities of hydrated lime, amounting to 10 or 15 per cent, to the weight of cement used in concrete mixtures and the ordinary mixing of such mixtures, the hydrate, which has absorbed a large amount of water, corresponding to its weight, is thoroughly disseminated throughout the concrete mass, and, due to its fine plastic conditions, it is forced immediately into places in the concrete which the cement cannot reach.

Concrete, so mixed, on leaving the mixer, flows more readily into place and the coarse aggregate has much less tendency toward segregation in the concrete mass. In other words, the extremely finely divided condition of the moistened hydrated lime paste has increased, to a marked degree, the covering or spreading quality of the cement, and reduced, to a similarly marked

* Extract from paper before the National Lime Manufacturers' Association.

degree, the friction between particles of fine and coarse aggregate.

This answers the question "Why does hydrated lime benefit concrete?" The action is purely a mechanical one, and can be compared to the oiling or greasing of a shaft or bearing. The property which hydrated lime has of absorbing and retaining large percentages of water offers a ready solution to the problem of finding a means for keeping and holding moisture in freshly poured concrete pavements until the slower-acting cement-hardening process can utilize it.

It is obvious that small percentages of hydrated lime, when added to concrete mixtures, in road work, will accomplish the following things:

1. Renders the concrete highly plastic and homogeneous, thus producing density and uniformity in the finished concrete. This condition adds much to the life and efficiency of the road because of the uniform resistance to wear and other stresses.

2. Keeps a certain amount of excess moisture in the concrete while setting.

3. Renders the concrete mass more nearly water-tight, thereby preventing the alternate wetting and drying out of the finished concrete.

4. In large pieces of work, these properties given to concrete by hydrated lime would materially reduce the labor in spreading and bringing the concrete to a uniform surface which is of great importance in paving work.

The County Engineer of Yesterday and Today

WITHIN the past decade the county engineer has come into prominence in this country. A few years ago the position of county surveyor, or engineer, in the average county of the United States went begging. The honor was an empty one. His chief duties consisted of running an occasional land line and selling county maps. Today in many sections the county engineer is the highest salaried officer of the county and his duties are varied and interesting. The increased importance of the duties of this official is probably due in a large measure to the activity in road construction of recent years.

In England and in some sections of this country this post has always been one of honor and importance—often descending from father to son—and justly so, for as a rule a man to successfully fill this position must possess a combination of tact and engineering and executive ability which is native in few men.

The successful modern county engineer is first of all an executive. His work consists largely of superintending foremen or inspectors, or both. His tact and uniformity of spirit must be exceptional since his dealings with men in many different walks of life are frequent and of importance. Affairs pertaining to the acquisition of right-of-way, the purchase of supplies, the letting of construction contracts, the hiring of labor, the organization and regulation of work, accounting and many similar matters calling for the exercise of judgment pass through his hands.

As an engineer he must be especially familiar with the details of road and bridge building, since a large portion of his work is in connection with these classes of construction. The engineering features connected with road maintenance are becoming important and require his constant personal inspection and judgment as to proper methods and tools to use. In addition to this knowledge he is required to know something of the operation and repair of tools and machinery using horse, gasoline and steam power, the composition and durability of paints and bitumens, methods of accounting, the properties of road materials, the purchase and care of horses and mules and other matters small and large, too numerous to mention.

The writer has in mind an engineer for a typical rural county who receives a salary of about $1,800 per year. He has under his direction three foremen and two inspectors, and has supervision of about 200 miles of road in all stages of improvement. Mules, machinery and equipment of all classes are in his charge, the value of which approximates $20,000. During the course of a year he directs construction work amounting to $150,000. In looking after their work he travels by horse and automobile several thousand miles a year in all kinds of weather. It is a man size job.

Perhaps the most attractive feature of this work to many engineers is its independence. While his term of office is, unfortunately, uncertain, and many undesirable factors of local politics enter, the county engineer is, nevertheless, his own boss. Quite frequently, also, an opportunity is afforded for outside work, which often adds materially to his income. Moreover, if he has leanings toward a farmer's life—as many county engineers have—an opportunity is afforded of carrying on this class of work in addition to his regular duties.

It is desirable that the standard set by county engineers throughout the country be high. Instead of belittling this class of work it behooves engineers in general to realize its advantages and lend their efforts toward the eradication of some of the attendant evils which make it objectionable at the present time.—*Engineering-Contracting.*

Building Public Roads With Prison Labor

State Engineer Lamar Cobb has recently issued a statement regarding the cost and efficiency of prison labor in the construction of public roads and bridges in Arizona. He finds, in studying the comprehensive cost-keeping system which his department employs, that where the prisoners

have to be kept under guard the cost of the construction work is about equal to the contract system, but is more economical than either force account or utilizing day labor; efficiency of prison labor under guard ranges from 66⅔ to 100 per cent. Where the honor system can be employed, the prisoners working without guard, the cost of both road and bridge construction he finds will range lower than under either contract or force account.

In San Joaquin county the county roads are kept in repair by convict labor and the authorities are well pleased with the results.

Road Construction Last Year Estimated $206,000,000

APPROXIMATELY $206,000,000 was spent last year on public roads in the United States, according to statistics prepared by the U. S. Department of Agriculture. This represents an increase of about 250 per cent in one decade, the estimate for 1904 having been $78,000,000.

This awakening on the part of the country to the importance of good roads is ascribed by the government investigators in large measure to the principle of state aid to counties and other local communities. New Jersey began the movement in 1891 when it passed its state highway law. Massachusetts and Vermont followed a year later, but for the most part the other states were slow to move. In 1904 only fifteen had state highway departments; today there are only six that have not. In 1913 the individual states appropriated a total of $38,755,088 to supplement local expenditures.

The value of this state aid is, however, not to be measured by the figures alone, for the bulk of the money comes, and always must come, from the counties and townships. Thus, in 1912, the cash outlay by counties, districts and townships was $137,493,985. Complete figures for 1913 are not yet available, but it is safe to estimate the sum at approximately $151,000,000. To this must be added some $15,000,000 to represent the value of the labor contributed instead of cash in districts where this practice prevails. Last year, therefore, local communities contributed, in round numbers, $166,000,000, as against appropriations from state treasuries of $38,755,088.

Engineer Fletcher Explains California State Highway Work

IN ANSWER to an inquiry for information on what he deems permanent road construction, Engineer A. B. Fletcher, of the California State Highway Commission, gives the following data:

"At the outset I have to confess that I know of no type of pavement which can truly be called 'permanent,' and the expression must be considered as only relative. I know of no pavement or roadway which does not require from the day it is constructed more or less expenditure for maintenance. If no other work is needed for the first few years the roadsides, gutters and culverts have to be looked after.

"As concerns the pavement proper, I believe of the types within the means of the more opulent states and counties at the present time that most nearly approaching the ideal consists of a concrete base of thickness sufficient to properly sustain the traffic which it must carry with a wearing surface of asphaltic concrete from one and one-half to two inches thick.

"Such a pavement twenty feet in width and with the base only four inches thick would probably cost under the conditions in your county not less than $14,500 per mile for the paved portion of the road, assuming that the concrete can be laid for $6.25 per cubic yard and the asphaltic concrete surface for six cents per square foot. To this must be added the cost of grading, culverts, drains and any special treatment of the shoulders or beams on the sides of the pavements.

"Few of the states and hardly any of the counties with which I am familiar can afford so great an expenditure per mile.

"In the instance mentioned a thickness of concrete base of four inches was assumed. In my opinion so thin a base should be adopted only when the subgrade is of excellent quality both as concerns the material composing it, and the rolling done upon it to make it compact and unyielding, and when the inspection of the construction is

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adequate. Eternal vigilance is necessary to prevent construction of the base thinner than the specifications provide for.

"If the base be increased in thickness to say five inches, one-fourth must be added to its cost or about $2,000 per mile, making a total probable cost of $16,500 per mile.

"It was early apparent to the Commission in its State Highway work that no such road as has been discussed above was possible if justice was to be done to all parts of the State. The main routes, requiring paving aggregating about 1,300 miles in length (less than one-half of the total mileage called for by the State Highways Act, if built as above described, but with the paving only fifteen feet wide, would cost, grading and culverts included, more than $16,000,000 and adding the overhead expense there would be almost nothing left for the other half of the system.

"This consideration led the Commission to seek a type of road cheaper in first cost, notwithstanding a consequential higher maintenance expenditure during the early years of its existence and the type called 'concrete base with bituminous top' was adopted rather generally.

"In this method of construction, the base is the same as if the one and one-half to two inches covering were to be applied, but instead a thin coating of asphaltic oil of special quality is put on to the concrete by spraying machines at the rate of about one-half gallon to the square yard. Clean stone screenings or coarse sand are then added in sufficient quantity to absorb the oil. The process requires much care in the selection of the materials used and in their manipulation, but the result is a bituminized coating about three-eighths of an inch thick. The cost of such surface work ranges from five to ten cents per square yard, or $600 to $1,200 per mile, roughly, for a twenty-foot pavement, depending on the cost of materials and local conditions. This means that more than ninety per cent of the cost of the work on the road goes into grading, culvert work and the concrete base, all of which may be considered as practically permanent, and the remainder into the thin wearing surface.

"Such a wearing surface should last from two to four years before it requires renewal, which renewal should cost considerably less than the original application. The thin surface is best adapted to rubber-tired vehicles, but it wears well under a considerable volume of mixed traffic consisting of both rubber and iron-tired vehicles.

"I would have no hesitancy in recommending the thin road surface for a road covering as many as from five to six hundred vehicles a day, provided a considerable portion of the vehicles are rubber-tired.

"If the concrete is covered with a thick one and one-half to two-inch coating of asphaltic concrete, under ordinary conditions, there will be but little cost for maintenance except on the roadsides and for cleaning culverts for the first five years, but after that period the surface will require attention from time to time in patching and applying seal coats, and when the road needs a new surface, it will doubtless be found that the maintenance cost has been in excess of two and one-half cents per square yard per annum.

"Another type of road which the Commission has constructed to the extent of nearly twenty miles is the so-called 'oil macadam' road. When properly built, I consider this type of work worthy of adoption in many cases, but it has been found, in this State at least, that it is very difficult to secure uniformly good results. There are many contributing causes to the failures or partial failures and the Commission has favored the cement concrete type because of the greater certainty of result and because also the concrete so far has cost about the same as 'oil macadam.'

"My experience in the East leads me to believe that the 'oil macadam' pavement costs for maintenance not much less per mile per year than the cement concrete base with thin asphaltic top, and this is borne out in the case of the San Joaquin County work here in California. Los Angeles County has constructed many miles of this sort of road and the costs of maintenance there should be easily obtainable."

HIGH GRADE
ELECTRICAL CONSTRUCTION WORK
FOR BUILDINGS
BUTTE ENGINEERING AND ELECTRIC CO., 683-87 Howard Street,
SAN FRANCISCO, CAL.

By the Way

Some Industrial Information Worth the While

Changing Oakland's Skyline

J. R. D. Mackenzie, Oakland's pioneer roofer, has recently published an attractive booklet, entitled, "Oakland, a City of Promise," and for illustrations Mr. Mackenzie shows some of the big sky-scrapers that have been erected in the Bay City in the past few years. All of these metropolitan structures are roofed with 5-ply asphalt and gravel, the work having been done by Mr. Mackenzie to the full satisfaction of the architect and general contractor. Among the buildings shown are the Thomson building, Walter D. Reed, architect; Hotel Menlo, F. D. Voorhees, architect; Syndicate building, Woollett & Woollett, architects; First Trust & Savings Bank building, L. B. Dutton, architect; Pacific building, F. D. Voorhees, architect; Castlewood apartments, C. W. McCall, architect, and the Dalziel building, Milwain Bros., architects.

The concluding pages of the booklet contain the following paragraphs:

"The better the building, the more certain it will have a Mackenzie roof; because first-class buildings are the work of first-class architects and engineers, and they know the relative values of the different types of roofing.

"This roof is built to order on the roof, to suit the special conditions of the building it is to protect.

"If you would have the cheapest roof in point of service it is possible to obtain—write for the Mackenzie specifications."

Sand and Gravel Output in 1913

Building operations are shown to have been active in 1913, according to the production of sand and gravel reported to the United States Geological Survey. The total output was 79,454,489 tons, valued at $24,165,837, and sand for building purposes constituted nearly one-third of it, or 25,367,060 tons, valued at $7,994,850. This is an increase in quantity of 1,591,047 tons and in value of $26,723 over the figures of 1912. The average value per ton, which increased from 31 cents in 1911 to 33½ cents in 1912, fell to 31½ cents in 1913.

The total increase in both sand and gravel in 1913 over 1912 was $11,099,028 value.

The production of glass sand in 1913 was 1,791,800 tons, valued at $1,895,991, showing an increase over 1912 of 326,414 tons in quantity and of $465,520 in value. The production of gravel in 1913 was 38,461,548 tons, large quantities of which were used for concrete, filter beds, roadmaking and grinding sand fell off in production, but paving sand nearly doubled.

Some Roofing

The Paraffine Paint Company recently forwarded to San Diego, a heavy car of Malthoid-Ruberoid roofing for the roof of the handsome new Santa Fe passenger station—this material being selected on account of its worldwide reputation for waterproof properties.

The new Broadway Department Store on Broadway, Los Angeles; the large new Rosslyn Hotel being erected at Fifth and

PRATT BUILDING MATERIAL CO'S TOPPING SAND

THE PRATT BUILDING MATERIAL CO., C. F. Pratt, Pres., Hearst Building, can give you 15 different kinds of sand, rock and gravel from 10 California counties—either rail or water deliveries.

Phone Douglas 300—easy to remember—for prices and sample.

ROBERT W. HUNT JNO. J. CONE JAS. C. HALLSTED D. W. MCNAUGHER

ROBERT W. HUNT & CO., ENGINEERS

BUREAU OF INSPECTION TESTS AND CONSULTATION

251 KEARNY ST., SAN FRANCISCO

NEW YORK LONDON CHICAGO PITTSBURGH ST. LOUIS SEATTLE TORONTO MEXICO CITY

CEMENT INSPECTION

INSPECTION OF STRUCTURAL AND REINFORCING STEEL

REPORTS AND ESTIMATES ON PROPERTIES AND PROCESSES

CHEMICAL AND PHYSICAL TESTING LABORATORIES

Main streets, the handsome concrete Bible Institute structure at Sixth and Hope streets are all being covered with this well-known paraffine product.

The beautiful permanent building at the Panama-California Exposition, San Diego—that of the "Southern California" Building, which houses the products of the seven Southern California counties, has also been completed at San Diego—and is roofed by the Paraffine Paint Company.

Business Serials

An interesting development in modern advertising is the serial advertisement—the story of some product told in separate chapters (as it were) in issue after issue of the journals. In using this form of advertising, a manufacturer assumes that his story is being read. And instead of striving to condense in one advertisement all that can be said on his product, he takes up one point after another and discusses it at length—believing that what the architect seeks is complete information, not a mere collection of bald, independent statements. Serial advertising essentially appeals to the reason of the reader. Not content with stating a fact, it explains that fact at length. The reader is not forced to a conviction, but is led to conviction on the points at issue by a logical appeal to his own judgment.

Contract for Yolo Basin Bridge

The lowest bid for the construction of the Yolo Basin bridge, which will be a connecting link between Sacramento and Davis, was submitted by the Graff Construction Company, of Seattle, for $239,703.80, and the contract has been awarded this concern.

Others who submitted bids were as follows:

Van Saant-Houghton Company of San Francisco, $243,877.35; Sound Construction and Engineering Company of San Francisco, $245,309; Mahoney Brothers of San Francisco, $260,868.35. The engineers' estimate of the cost was $248,385.63.

This bridge was described in the July Architect and Engineer. It will be three miles long and will extend from the end of Washington Lake to the west end of the Southern Pacific trestle this side of Webster. Three-quarters of the trestle will be constructed of cement and the last quarter will be frame.

George—What a fine building that is across the way.

Charles—Yes, yes; but the owner built it out of the blood, aches and groans of his fellow-men; out of the grief of crying children and the woes of wailing women.

George—Ah! A rumseller of course. Yes, yes!

Charles—Oh, no; he's a dentist.—*Kansas City Journal.*

DIECKMANN HARDWOOD CO.

SAN FRANCISCO, CAL.

350 to 398 BEACH STREET, COR. TAYLOR

CARRY A LARGE WELL ASSORTED STOCK OF

HARDWOODS

AND SOLICIT YOUR INQUIRIES.

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BUILDING CONSTRUCTION
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1218 BROADWAY, OAKLAND, CAL.

BAY DEVELOPMENT COMPANY
GRAVEL - SAND - ROCK
Telephone, Kearny 5313—J 3535 153 BERRY ST., SAN FRANCISCO

Phone Douglas 3224
HUNTER & HUDSON, Engineers
Designers of Heating, Ventilating and Wiring Systems.
Mechanical and Electrical Equipment of Buildings.
729 Rialto Bldg. San Francisco, Cal.

LIGHTING HEATING PLUMBING
We Guarantee Good Work and Prompt Service. ¶No Job too small—none too big. We Employ Experts in all Three Departments and they are always at your service. Get Our Figure.
CENTRAL ELECTRIC COMPANY
155 STEVENSON STREET, SAN FRANCISCO 411 EXCHANGE BUILDING, LOS ANGELES
PHONES: DOUGLAS 387; HOME, J 1594 L. R. BOYNTON, MANAGER

G. CIVALE, Manager Telephone Franklin 8672
FLORENTINE ART STUDIO
Modeling, Marble Carving, Statuary, Monuments
Show Rooms, 932 VALLEJO STREET
Workshop, 1644 STOCKTON STREET SAN FRANCISCO, CAL.

The Granite Work on Eldorado County Courthouse; National Bank of D. O. Mills, Sacramento;—and Sen. Nixon Mausoleum, Reno, WAS FURNISHED BY
CALIFORNIA GRANITE COMPANY
Phone Sutter 2646 **STONE CONTRACTORS**
San Francisco Office, 518 Sharon Bldg. Main Office, Rocklin, Placer Co., Cal.
Quarries, Rocklin and Porterville Telephone Main 82

SAMSON SPOT SASH CORD

Trade Mark Reg. U. S. Pat. Office
Guaranteed free from all imperfections of braid or finish. Can always be distinguished by our trade mark, the spots on the cord. Send for samples, tests, etc SAMSON CORDAGE WORKS, BOSTON, MASS.
Pacific Coast Agent, JOHN T. ROWNTREE, 575 Monadnock Bldg., San Francisco, Cal., and 701 Higgins Bldg., Los Angeles, Cal.

Massachusetts Bonding and Insurance Company
621 FIRST NATIONAL BANK BUILDING SAN FRANCISCO TELEPHONE SUTTER 2750
The Very Best Place to Get Your —— BONDS AND CASUALTY INSURANCE
Satisfaction Guaranteed ROBERTSON & HALL, Managers No Red Tape

A New Tile Firm

The tile business conducted for several years in San Francisco by the Watson Mantel and Tile Co. has been purchased by a new firm, the California Tile Contracting Company, with offices in the Sheldon building, San Francisco.

The members of the new company are all experienced tile men. Mr. J. Clark, president and general manager, was for years sales manager of the big Zanesville, Ohio, tile concern, J. B. Owen's Floor and Tile Co. Undoubtedly Mr. Clark and his company will get their share of the tile business of Northern California.

Metal Furniture and Jail Work

Charles M. Finch, Board of Trade building, San Francisco, who represents the Canton Art Metal Company, has recently taken the contract for supplying all the metal furniture in the new court house at Los Vegas, Nev. Mr. Finch has also secured the contract for furnishing and installing a complete cell equipment in the Santa Rosa jail. The contract amounts to about $25,000. The Ralston Iron Works of San Francisco will turn out the material.

Factory Branch for Austin Mixers

The Municipal Engineering and Contracting Company of Chicago, Ill., manufacturers of the Austin Improved Cube Mixer, are no longer represented in California by the Lansing Company of San Francisco. They have now a direct representative, Mr. A. M. Skillman, whose temporary address is 1235 Pine street, but a permanent office will be opened shortly, and a full line of cube mixers, including special street paving machines, will be carried in stock.

WARNING

The Reliance Ball Bearing Door Hanger Co. is owner of Letter Patents of the United States No. 756,-321, dated April 5, 1914, for Elevator Doors.

2....This patent covers all two speed doors in which the two doors are hung from separate tracks and are operated through a rack bar secured to one of the doors, a stationary rack, and a pinion carried by the other door and in mesh with the two rack bars.

3....**The Diamond Door Hanger Co.** has been licensed by us under this patent.

4....All rights under this patent are strictly enforced.

RELIANCE BALL BEARING DOOR HANGER CO.

30 East 42nd Street, New York

Guaranteed Building Specialties

SEE OUR LIST

Enameled Brick (American Enameled Brick & Tile Co.)
Safety Treads (American Mason Safety Tread Co.
Hollow Metal Steel and Bronze Doors and Trim (Monarch Metal Mfg. Co.)
Revolving Door (Atchison.)
Medicine Cabinets (Corey Metal Mfg. Co.)
Metal Lockers (Hart & Cooley Co.)
Warehouse Doors, Rolling Steel Shutters, Garage and Elevator Doors (Variety Manufacturing Co.)
Dumb Waiters (Energy Elevator Co.)
Radiator Valves (Lavigne Manufacturing Co.)
Elevating Window Fixtures (Tabor Sash Fixture Co.)
Metal Weather Strip, Bronze and Zinc (Monarch Metal Weather Strip Co.)
Waterproofing Compound and Steel Cement Hardener ("Iosulite," "Aquabar" and "National.")
Venetian Blinds (Swedish Venetian Blind Co.)

C. JORGENSEN & COMPANY 356 MARKET STREET SAN FRANCISCO

Telephone Kearny 2386

Showing Union Blind & Ladder Company's Rolling Doors for Garage Purposes

Wood Rolling Doors

BACKED by sixteen years experience, the Union Blind & Ladder company of Oakland is conducting an aggressive campaign in the interest of home industry. As manufacturers of the Acme vertical coiling doors and horizontal rolling partitions, it points to hundreds of installations not only in California but throughout the East which go to show that the local industry can compete with the outside world, and that it is not necessary always to go East to get a good article.

The Acme doors and partitions afford possibilities for wonderful economy of space and are used in schools, churches, garages, depots, auditoriums, etc. The advantages of rolling partitions over other forms of closures are readily seen, being designed to cover all openings where economy of space and ease of operation are considerations. They dispense with large and troublesome folding or accordion doors and pockets at the sides, permit a better seating arrangement and unobstructed view.

Rolling doors are particularly desirable for churches, forming the partition between the main auditorium and the class rooms, and when raised materially increase the seating capacity of the former. Here is an unsolicited letter from Leo C. Tuch of the First Methodist Church building committee, Oakland:

UNION BLIND AND LADDER CO.,
OAKLAND, CAL.

Dear Sirs: The rolling partitions which you have installed in our new church are excellent. They run easily and I am satisfied that they will give long service. Aside from these practical qualities they also have the virtue of being neatly constructed and are in no way a disfigurement to the rooms. Rather, they form a series of panels that is plesing to the eye and harmonizes with the whole scheme of construction. We shall be glad to show the partitions to any prospective purchasers and Iam sure they will look at them and handle them, they cannot fail to recognize their merits.

The members of the building committee appreciate the good qualities of your partitions as well as the thorough manner in which you have done your work and your willingness to accommodate them throughout and have asked me to let you know their feelings.

It is interesting to note that the Union Blind & Ladder Company's doors are used in the upper corridors of the great Ferry building—having been in constant use there for the past fourteen years.

Since the automobile came into general use the company has been specializing in a horizontal wood rolling door for both private and public garages.

It rolls up above the door opening, giving clear space; takes no valuable room in the garage and operates easily with one hand.

The use of a wood rolling door does not increase the fire risk and takes the same insurance rate as the steel door (except in case of extremely hazardous exposure.).

It is cheaper, much easier to operate, noiseless, practically no expense in up-keep, and lasting in efficiency.

Established 1886 **Phone, Market 2848**

T. H. MEEK COMPANY

Show Cases, Hardwood Interiors
General Cabinet Making

Manufacturers of BILLIARD TABLES, STORE, OFFICE AND BAR FIXTURES

Factory,
1189-65 Mission St. and 660-70 Minna St.

Salesrooms.
1157 Mission St. San Francisco

Oil Safety and Saving for Your Clients

For the Garage

For the Factory

When planning a home, power plant, store or any building, remember that Bowser Storage Systems mean safety and saving in the storing and handling of gasolene and oils of all kinds.

BOWSER ESTABLISHED 1885 — Safe Oil Storage Systems

In the Garage a Bowser Outfit keeps all the "Gas" in gasolene safe underground. Keeps the *power* in—dirt and danger out. Saves space in the garage—makes the garage truly *modern.*

In Factories Bowser Systems save oil, keep it clean, automatically measure without containers, save floor space, make men thrifty and efficient in the handling of oils. Keep premises tidy—cut dowo oil cost. Economy and utility all 'round.

Bawser infarmation for the architect will be gladly sent upon request. No charge—ao obligatian. Write taday.

S. F. Bowser & Company, Inc.

Engineers, Manufacturers and Original Patentees of Oil Handling Devices

39172 Thomas St., Fort Wayne, Indiana

612 Howard St., San Francisco, Cal.

Telephone—Douglas 4323

Carpenters Want New Rules

A committee appointed by the Carpenter-Contractors' Association, of Chicago, to formulate and recommend certain changes in building specifications, has filed its report. This report, representing the carpenters' side on points often in controversy, should be of interest to architects. The Chicago Association has mailed its report to every Chicago architect, asking that the issues raised be given consideration. Here are the items which, in the opinion of the carpenters, call for adjustment:

No. 1. Broken glass is specified to be paid prorata by the carpenter. Should be eliminated.

No. 2. The patching of plaster by carpenter should be eliminated.

No. 3. The protection of cut stone shall be specified so that the responsibility of the carpenter contractor ceases after covering same, and anyone removing covering be held liable for the damage thereto.

No. 4. If carpenter is required to furnish watchman, specify time services of said watchman are required.

No. 5. The delivery of hardware and responsibility of same shall be limited to the delivery of boxes and cases, but no responsibility is to be assumed by the carpenter for contents thereof.

No. 6. Priming of frames should be eliminated from carpenter's specifications as factories refuse to prime frames.

No. 7. Lumber for bracing of iron will not be furnished by carpenter.

No. 8. Carpenter will not clean the rubbish of other contractors.

No. 9. Setting of iron should be eliminated from carpenter's specifications.

No. 10. The carpenter contractor will not furnish any labor or material for work that is required and not specified or shown on plans, but necessary to complete the job.

No. 11. The carpenter shall not be held liable for any damage to finished floor by other trades.

No. 12. Carpenter will not be responsible more than thirty days after completion of building for fitting of doors, locks, or windows, caused by the settling of walls or joists and swelling or shrinkage of woodwork.

Two Important Bulletins

The Chicago Pump Company, manufacturers of electric pumping machinery, and represented in San Francisco by the Telephone-Electric Equipment Company, 612 Howard street, has just published two important bulletins numbered 22 and 23, and architects will find the specification forms contained in these books of considerable value, especially where it is desired to make use of the multi-stage turbine horse pump. The book tells of the high efficiency of the Pneumatic Water System and the importance of grease lubrication in bilge pumps.

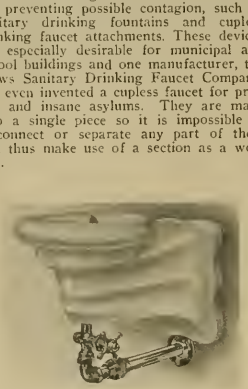
Family Is in Paris

Architect William Mooser of San Francisco was quite anxious for a while for the safety of his family, who were traveling on the continent at the time the war broke out. Telegrams, however, brought the comforting intelligence that they were safe in Paris, where Mr. Mooser's son has been studying at the Ecole des Beaux Arts. Mrs. Mooser and Miss Dorothy Mooser were with the young student and all will return to America at the first opportunity.

An Ideal Sanitary Drinking Fountain

NEVER before have there been such extreme precautions taken to prevent the spread of contagious diseases as are exercised today and the part that the architect takes in this laudable campaign is second only to the physician himself. Nowadays when an architect designs a public building, or even a private home, for that matter, he is expected to make the structure as safe against the ravages of disease as against structural weakness. There must be good ventilation, plenty of light, ample heat and high grade plumbing.

Besides all this he is expected to keep informed with regard to the newest devices for preventing possible contagion, such as sanitary drinking fountains and cupless drinking faucet attachments. These devices are especially desirable for municipal and school buildings and one manufacturer, the Haws Sanitary Drinking Faucet Company, has even invented a cupless faucet for prisons and insane asylums. They are made into a single piece so it is impossible to disconnect or separate any part of them and thus make use of a section as a weapon.



Special Drinking Fountain for San Francisco City Hall

Mr. Haws may truly be called the father of the modern drinking fountain. His was the first patent to be issued which provided a solid bulb from which the water bubbles and once forced up there is no possible way for it to settle back into the fixture and there become polluted or germ-laden.

One of the latest models produced is shown in the accompanying illustration, twenty-five of which are to be installed in the new San Francisco city hall. They are simple yet ornate and not at all complicated.

Speaking of the merits of his device Mr. Haws said: "My faucet offers to the public an inexpensive, ornate and convenient device. It is adaptable to any sink, wash-basin or public fountain. It has been given immediate recognition, and is giving the best of satisfaction wherever tried.

"This faucet has been given a great deal of study toward getting it to a point of quality, low cost, durability and cleanliness, the particular points in its favor being: There are no parts that can be dismembered; there is absolutely no cup attached to it, which all other kinds now on the market have; the ball enlargement on end of tube being vitreous china makes it absolutely impossible for dirt or germ to remain on or around it, the water washing over it makes it self-cleansing. It is constructed with a concealed regulating device for the purpose of regulating flow of water at any height under any pressure."

Here are a few places where Haws' Sanitary Drinking Faucets are in use and giving the best of satisfaction:

State University of California, at Berkeley.
Affiliated Colleges, San Francisco.
Davis Farm, Davis.
Mt. Hamilton, Mt. Hamilton.
State Manual School, San Diego.
State Normal School, Los Angeles.
State Normal School, San Jose.
State Normal School, San Francisco.
State University of Washington, Seattle, Wash.
All the Public Schools, San Diego.
All City Parks, San Diego.
All City Schools, Long Beach.
City Schools, Santa Cruz.
City Schools, Stockton.
City Schools, Berkeley.
City Schools, Alameda.
City Schools, Oakland.
City Schools, Richmond.
City Schools, San Mateo.
City Schools, Redwood City.
City Schools, Fresno.
City Parks, Fresno.
City Schools, Bakersfield.
City Schools, Coquille, Ore.
City Schools, Goldendale, Wash.
S. P. Co.
Owl Drug Stores, San Francisco.
Pacific States Telephone Co.
Standard Oil Works.
Union Iron Works, San Francisco.

$12,000,000 Worth of Contracts

Merely to show that there are a few big jobs looking for contractors, it may be stated that plans and specifications are now on the market for construction work that will require the expenditure of fully $12,000,000. One of these undertakings calls for the building of 85 miles of concrete aqueduct for the Greater Winnipeg Water Supply District of Winnipeg, Man. This project is divided into five contract sections and will cost something like $8,000,000. Another contract calls for the construction of a traffic tunnel under Twin Peaks for the city of San Francisco. This bore will be about 13,000 feet long, will be driven through rock for the most part and will cost about $4,000,000. A third improvement calls for the construction of a large bridge for the city of Toronto, Ont. This is the Don Section of the Bloor street viaduct. The carrying out of the work involves the erection of five steel spans, the longest being 282 feet. The structure will have a total length of 1,618 feet, and a clear width of 86 feet. It will require 5,600 tons of steel and 46,000 cubic yards of concrete.

A. C. SCHINDLER, President. CHAS. F. STAUFFACHER, Secretary

THE FINK & SCHINDLER CO.

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Bet. Mission and Howard Sts. Telephones: Market 2251 Home M2251

Gasoline Gas as a Means of Lighting, Heating and Cooking

By HERBERT MIEVILLE.

FOR many years gasoline gas has been used for the purpose of lighting, heating and cooking, more especially in isolated towns where neither city gas nor electricity has been available.

It is fast superceding acetylene gas, which is recognized chiefly as a lighting proposition, its cost, when employed for cooking purposes, being expensive and somewhat dangerous.

It is highly probable that in the very near future the public will use gasoline to a large extent from which to make their gas for either or all of the three purposes referred to. Most owners of country homes have their automobiles and are therefore familiar with the handling of gasoline, and it is no more trouble to empty a can of gasoline in a gas generating plant, than to fill a tank on their motor car, and certainly no more dangerous.

There are two qualities of gasoline gas used for these purposes—"the wet, or rich gas," and "the three per cent mixture." The former contains eight to ten per cent of hydro-carbon vapor, to ninety or ninety-two per cent of air, while the latter does not exceed three per cent of gasoline vapor to ninety-seven per cent of air.

The former quality of gas has up to lately held the field and many and varied are the machines now on the market for the production of this gas. Unfortunately, however, this former quality gas is solely a production of the lighter grades of gasoline, which are readily volatile, and having a gravity not lower than seventy-two degrees Baume.

The cost of these lighter grades of gasoline is more or less prohibitive, besides being extremely difficult to obtain.

There are, however, at the present time machines on the market which will produce a "three per cent mixture gas" from the ordinary grade of motor gasoline, now selling for approximately 18c. a gallon and possessing a gravity from sixty to sixty-two degrees Baume, and it is on this quality of gasoline gas that the following remarks apply, as the writer believes the future of the industry depends very largely upon a machine capable of handling the commercial grade of gasoline met with every day, and obtainable everywhere, rather than in a special grade difficult to acquire.

This gas then is a mixture of air and gasoline vapor computed as Hexane (C_6H_{14}) the proportion of the latter not exceeding three per cent of the former. Its combustion, without added air, produces a perfect bunsen flame, having a blue outer cone with a greenish seating free of yellow flame.

This flame gives the maximum heat units, namely, 161 British Thermo units to each cubic foot of mixture consumed, and one gallon of gasoline when vaporized, will produce approximately 775 cubic feet of gas, aggregating 126,000 units of heat.

This proportion gas is most efficient for all round use. The mixture itself contains sufficient air for combustion, consequently taking none of the oxygen from the room in which it is burning. It is also free of carbon, causing neither dirt, odor, or poisonous fumes. Its chemical analysis is as follows:

Oxygen (O_2)	19.5%
Nitrogen (N_2)	77.2%
Carbon Dioxide (CO_2)	0.1%
Hydrocarbon Vapors Computed as Hexane (C_6H_{14})	3.2%

The machines now procurable for producing this gas, and capable of handling this everyday gasoline, are extremely simple in construction, entirely automatic and require very little looking after—the necessary air pressure being obtained either from an electric motor, hot-air engine, or water wheel—automatically governed. The gas is always ready for use, and ordinary sized gas pipes are employed for its transmission from the generator to the burner; there is also no condensation.

In conjunction with a small Welsbach mantle, the gas produces a most brilliant white light, its natural flame is intensely hot, clean and healthy, and moreover, it is perfectly safe, as directly the gas escapes (without being ignited) it becomes non-explosive.

Providing, therefore, the generator is simple, well constructed, and automatic in its working, its product should appeal to many as a superior artificial means for one or all of the three uses for which it can be so advantageously employed. .

Eagles Building Will Cost $75,000

Architect James W. Plachek, Acheson building, Berkeley, has been commissioned to prepare plans for a three-story reinforced concrete lodge building for the Sisson Eagles. The estimated cost is $75,000. The ground floor will contain stores. Only preliminary plans have been prepared thus far. Mr. Plachek has completed plans for a residence to be erected in Sisson for Forest Supervisor R. H. Hammatt. The cost will be about $4,000.

Current Prices of Building Materials

These quotations furnished by reliable San Francisco and Los Angeles dealers

(Names and addresses will be supplied upon request.)

SAN FRANCISCO PRICES

Common Red Brick, $6 50 per M, ex. cars.
No. 1 Pressed Brick, $35 00 to $40.00 per M; Wire cut, $35.00 per M.
No. 1 Red Pressed Brick, $20.00 to $30.00 per M.
Red Stock Brick, $12.50 per M.
California Portland Cement, C/L $2.30 per bbl.; L.C.L. $2.55 per bbl.
White Cement: Atlas, $6.00; Medusa, $6 80 per bbl.
Sand and Gravel mixed, 70c per ton, F. O. B. cars.
Sand (washed, screened river sand) 75c per ton, F.O.B. cars.
Bank Sand, $1 00 per cu. yd.
Roofing Gravel, $1.40 per ton.
Crushed Rock or Gravel, 75c per ton.
Red Roofing Tile, $22.00 to $25.00 per square, laid.
Brick Lime, $1 35 per bbl., C/L.
Finish Lime, $1 50 per bbl., C/L.
Hardwall Gypsum Plaster, $9.40 per ton, C/L, ex. whse.
Oregon Pine, Rough Common, 1 x 3 to 1 x 10, $14.00.
Oregon Pine, Rough, 2 x 3 to 2- 12, $15.00.
Oregon Pine 1 x 4 T. & G. Flooring, No. 1, $35 per M; No. 2, $32; No. 3, $26.
Oregon Pine T. & G. Ceiling, No. 1 and 2 mixed, $27 to $30.
Redwood, Rough Common, 1 x 4 and up, $22 00.
Redwood, Rough Common, 2 x 3 to 2 x 10, $22.00 to $24.00.
Redwood Rustic, No. 1, $36 00; No. 2, $32 00.
Redwood Ceiling, No. 1, $32 00; No. 2, $28.00.
Redwood Shingles, No. 1, $2 80 full count.
Red Cedar Shingles, Star-A-Star, $3 00 full count.
Pine Lath, $2.85.
Metal Lath, 13 to 25c per yd., according to quality.
1 x 3 Oak Flooring, Q. S. Clear, $120.00 per M; Select, $80 00 per M.
½ x 2½ Oak Flooring, Q. S. Clear, $96.00 per M; Select, $74 00 per M.
1 x 3 Maple Flooring Clear, $75.00 per M; Clear White, $105.00 per M.
White Lead in Oil, 8c per lb.
Dry Red Lead, 8¼c per lb.
Boiled Linseed Oil, 74c gal. Raw Linseed Oil, 73c gal.
Turpentine, per gallon, 63 to 70c in bbls.
Dry Shellac, 35c per lb., variable.
Hyloplate Blackboard, 25 to 35c per foot, installed.
Composition Flooring, 25 to 30c per foot, laid.
Genuine Slate Blackboards, 40 to 50c per foot, erected.

LOS ANGELES PRICES

Common Red Brick, No. 2, $4 50 per M.
Clinker Brick, $9 00 per M.
Pressed Brick, $45.00 per M.
Enameled Brick, $65.00 per M.
Red Roofing Tile, $12 00 and $15 00 per square (not laid).
White Cement, $6 00 per bbl.
Portland Cement, $2 30 per bbl.
Lime, $1 50 to $1 75 per bbl.
Hardwall Plaster, per ton, $9 00 ex. whse.
Oregon Pine, Rough Common, 1 x 3 up, $17 00 to $19 00 per M.
Oregon Pine, Rough Common, 2 x 3 up, $17 00 to $21 00 per M.
Oregon Pine Flooring, 1 x 4, No. 1, $40 00; No. 2, $35 00; No. 3, $22 50 per M.
Oregon Pine Ceiling, 1 x 4, No. 1, $36 00; No. 2, $31 00.
Redwood, Rough Common, $20 00 to $24 00.
Redwood Rustic, No. 1, $38 00; No. 2, $33.00 per M.
Redwood Ceiling, 1 x 4, No. 1, $33 00; No. 2, $28 00 per M.
Redwood Shingles, 4 bdls. to M, No. 1, $2.25; No. 2, $1 75.
Red Cedar Shingles, 4 bdls. to M, Star-A-Star, $2.75.
Pine Lath, 1½ in. x 4 ft., $3 25 per M; 1⅝ in. x 4 ft., $3 65 per M.
White Lead in Oil, 8½c per lb.
Red Lead, dry, 8½c per lb.
Raw Linseed Oil, bbls., 65c gallon.
Boiled Linseed Oil, bbls., 70c gallon.
Turpentine, bbls., 63 to 70c, gallon.
Crushed Rock and Gravel, $1.65 per yard.
Sand, 85c per yard.

SACRAMENTO PRICES

Common Brick, $7 00 per M, C/L.
Pressed Brick, Wire Cut, $30 00 per M, C/L.
Portland Cement, $2.40 per bbl, carloads.
Crushed Rock and Gravel, 65c per ton, ex. cars.
Sand, $1.00 yd. on cars.
Roofing Gravel, $1 50 per ton.
Lime, $1.35 bbl.
Hardwall Plaster, $11.40 per ton, ex. whse.

STOCKTON PRICES

Common Brick, $7 75 per M, del.
Face Brick, Wire Cut, $31 00 per M C/L.
Cement, $2.40 per bbl., C/L.
Crushed Rock and Gravel, 90c ton.
Sand, 90c.
Roofing Gravel, $1 50 per ton.
Lime, $1 35.
Hardwall Plaster, $11 40 ex. whse. per ton.

FRESNO PRICES

Common Brick, $9.50 per M, del.
Face Brick, Wire Cut, $35.00 per M, C/L.
Cement, $2.84 per bbl., C/L.
Crushed Rock and Gravel, $1.35 per ton.
Sand, $1 35 per yd., del.
Roofing Gravel, $1 85 per ton.
Lime, $1 50 bbl.
Hardwall Plaster, $12.40 per ton, ex. whse.

BAKERSFIELD PRICES

Common Brick, $9 00 per M, del.
Face Brick, Wire Cut, $37.00 per M, C/L.
Cement, $2 77 per bbl., C/L.
Crushed Rock and Gravel, $1 80 per ton.
Sand, $1.00 per yd., del.
Roofing Gravel, $2.00 per ton.
Lime, $1 50 per bbl.
Hardwall Plaster, $13 40 per ton, ex. whse.

CHICO PRICES

Common Brick, $11 00 per M, del.
Face Brick, Wire Cut, $35 00 per M, C/L.
Cement, $2 65 per bbl.
Crushed Rock and Gravel, 85 to 90c per ton, C/L.
Sand, $1.00 per yard.
Roofing Gravel, $1 50 per ton.
Lime, $1 40 bbl.
Hardwall Plaster, $14 00 per ton, ex whse.

The Whitney Self-Adjusting Window

TO THE architects of San Francisco who have heard on all sides (even from far eastern points) of the merits of the Whitney self-adjusting, reversible windows, it will be a welcome bit of news that an office has been opened in the Sharon building, where these windows can be seen in their various types and styles, and where particulars as to specifications, price, etc., can be secured.

The prevailing and most-sought-for styles are:

1. The Single Casement.
2. The Double Casement.
3. The Double Hung Window.

The casement window problem seems to have been solved in this window, for we have in the Whitney window one which is storm-proof and dust-proof and can be easily screened from the inside, as no adjusters are used. It is, moreover, an anti-rattling window and by reason of its sliding on one piece on a solid brass interlocking track, it secures unobstructed vision. It is worked from the inside of the room and is so simple that it is impossible for it to get out of order. In the single sash window, the track or guide on the sill interlocks with a sliding shoe. This shoe is attached to the sash by means of a pivot plate at the corner and a swinging arm attached to the opposite corner of the window frame. A duplicate arm is connected to the top of the sash and the window frame; also a roller guide placed on the corner of the window directly above the sliding shoe, and fitting into a groove in the head. The arms attached to the window and to the casing swing out as the window is opened, drawing the opposite edge of the sash away from the side of the frame, though still retaining its connection to the frame by the interlocking shoe and roller guide. These same arms act as adjusters to hold the windows in whatever position placed, and by this operation make a self-adjusting window.

The feature of having the sash free from the side of the frame makes the washing from the inside of the room an easy matter and eliminates the usual risk of heavy Liability Insurance involved by other systems.

When two sashes are used they are hinged together and they fold one upon the other. They can, therefore, be moved from side to side, still retaining their connection with the window frame by means of the interlocking shoes and roller guides.

The wind will not affect the windows when opened, with the result that no adjusters are required, each sash acting as the adjuster of its mate.

A Seattle architect, David J. Myers, writes as follows:

"Architects have found the casement windows almost indispensable to give character to some classes of work, but after having a delightful seance with some irate client who claims that the window sticks, leaks, the adjusters won't work, the fly screens are not right, etc., etc., they ofttimes feel like cutting them out. If one will examine the Whitney control, they will see how all these troubles have been overcome in a simple and clever manner."

With regard to the Whitney Double Hung Window, much in its favor might be said. The prevailing local type of this class of window has been misnamed. It should be called the "Complex." The Whitney window has three arms—two long and one short, giving perfect control. It reverses all the way around. Any number of sash may be put into an opening without the use of mullions.

The Whitney windows may be had in wood or metal in any standard sizes—or will be furnished in any special designs or measurements. A specialty is made by them of sun parlor and sleeping porch casements, and their bungalow types will be found to be of particular interest.

Diagrams and elevations will be furnished free by inquiring of the local manager, Wm. S. Pringle.

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Weights
Weight Boxes
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Railway Commission Denies It is Holding Up Contract

The California State Railroad Commission is not holding up the contract for the construction of the new San Diego & Arizona railway, according to President Eishelman. The president said that the builders of the new line are laying the responsibility on the railroad commission for political purposes, but as a matter of fact the commission has nothing more to do with the contracts.

The commission head absolutely denied Titus' statement that the commission still has to pass upon the contract, which is said likely to be awarded to the Utah Construction Company.

Pleasure Resort

Frederick Whitten of San Francisco will supervise the erection of a group of ten buildings at Blairsden, Plumas County, for the Interstate Resort Company. The buildings will form one of the finest resorts on the line of the Western Pacific Railway. The main building will be a two-story log hotel with about thirty guest rooms. There will be nine log cottages containing from three to ten rooms each. All buildings will be finished in the rustic style. The plans include a reinforced swimming tank.

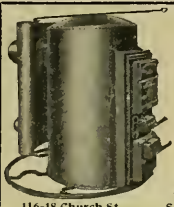
New City Engineer for Sacramento

Frank C. Miller has been appointed City Engineer of Sacramento to succeed Albert Givan, resigned.

Miller was formerly County Engineer, but resigned that position to accept the city position. His appointment will date from August 16th. The office pays $3,600.

Burlingame Home

Architect John J. Foley has drawn plans for a high-class dwelling to be built for J. H. Hatch in Burlingame. The house will contain eight rooms and cost about $7,500.



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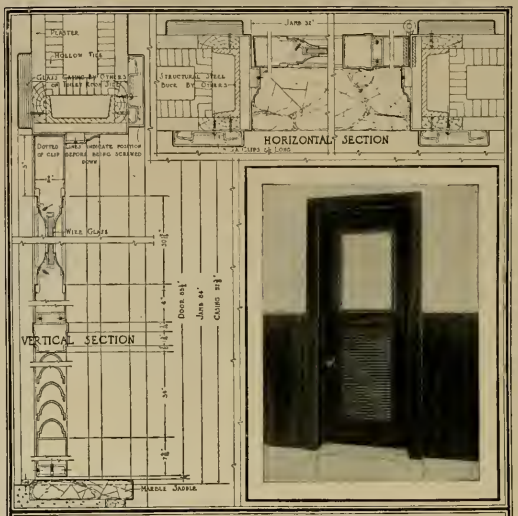

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The new steel louvre doors installed in the Consolidated Gas Building, New York City, by the Dahlstrom Metallic Door Company, represent the latest development in this type of door and eliminate the objectionable features found in the old style louvre doors, or doors having ventilators in one or more panels. The inclined slats in the old style doors allowed vision through the doors in a downward direction from one side and upward from the opposite side.

The louvres or ventilators in the Dahlstrom doors are constructed in a manner to obstruct all vision through the doors from either side, at the same time affording perfect ventilation. They are more attractive than the old style slats and present the same appearance from each side. On account of the formation of the bars in the louvres they are very much more rigid and stiff than the inclined flat slats. They are made in the cold drawn process and permit of any desired ornamentation within reason.

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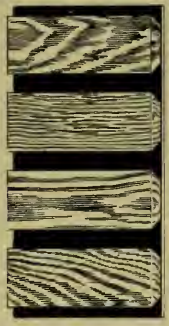

This shows the construction of stucco or plaster board—Dovetail Lath—damp proof mastic-fiber board.

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BOSTON, JULY 14, 1914.

As so many of our customers and business friends have been interested to know the result of our suit against Fisher, Thorsen & Co., of Portland, Oregon, to protect our rights to the exclusive use of our trade mark "BAY STATE" as applied to paints, varnishes and painters' supplies, we herewith append a copy of Final Decree in this case.

WADSWORTH, HOWLAND & CO., Inc.

IN THE DISTRICT COURT
OF THE
UNITED STATES
FOR THE
DISTRICT OF OREGON

WADSWORTH, HOWLAND & CO., Inc.
COMPLAINANT

VS.

H. J. FISHER, M. G. THORSEN and C. J. SMITH
DOING BUSINESS UNDER THE NAME OF
FISHER, THORSEN & CO.
DEFENDANTS.

FINAL DECREE

This cause having come on to be heard at this term, 1914, the complainant appearing by Mr. T. J. Geisler of Portland, Oregon, and Mr. Everett E. Kent, (Mitchell, Chadwick & Kent, Solicitors), of Boston, Massachusetts; and the defendants by Mr. Joseph Simon, (Dolph, Malory, Simon & Gearin, Solicitors,) of Portland, Oregon, and the Court having been duly advised in the premises; now upon consideration thereof, it is by the Court,

ORDERED, ADJUDGED AND DECREED

I

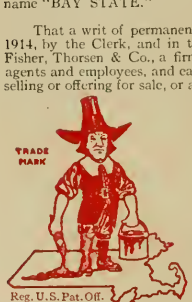
That the complainant, Wadsworth, Howland & Co., Inc., is the lawful and exclusive owner of the trade-mark and trade-name "BAY-STATE" for paints, varnishes and painters' supplies.

II

That the defendants, their agents and employees shall forthwith destroy all labels not affixed to goods, and all advertising material, now in their possession, bearing the name "BAY STATE."

III

That a writ of permanent injunction be issued in this cause as of September 15, 1914, by the Clerk, and in the usual form, perpetually restraining the defendants, Fisher, Thorsen & Co., a firm, and the members thereof, jointly and severally, their agents and employees, and each of them, from directly or indirectly manufacturing or selling or offering for sale, or advertising in any form to the public any paints, varnishes or painters' supplies under the name or as "BAY STATE" not being goods made or sold by Wadsworth, Howland & Co., Inc., the complainant herein.



Reg. U.S. Pat. Off.

IV

That on or before September 15, 1914, the defendants, their agents and employees, shall withdraw from the market all said goods of whatsoever nature now in their possession or under their control bearing the name "BAY STATE"; and all containers and packages of said goods bearing the name "BAY STATE" not so withdrawn shall then forthwith be destroyed.

JULY 7, 1914.

CHARLES E. WOLVERTON,
United States District Judge.

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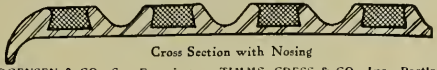

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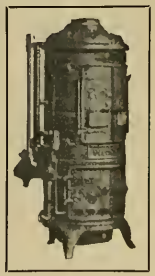

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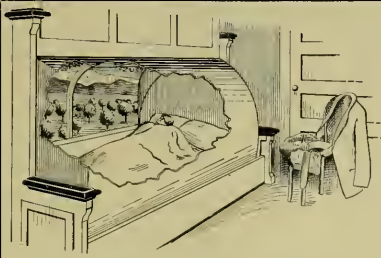

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A panoramic reproduction of the Grand Canyon of Arizona is being built at the Panama-Pacific International Exposition at a cost of over $300,000. Some 50,000 square yards of linen canvas, imported from Scotland, are being used for the set pieces. Visitors in this concession will view the panoramas from observation parlor cars, moved by electricity on an elevated trestle, seemingly along the rim of the canyon. The observer will be enabled to see eight of the most distinctive points of the canyon and the ride will last over half an hour, including, apparently, a journey of more than 100 miles of the great gorge. Every resource of modern science is employed in the work of reproduction.

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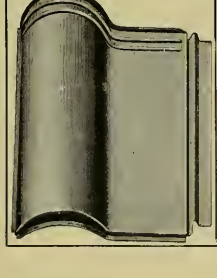

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Metal Lath Stands Severe Fire Test

THE accompanying photographic illustrations tell more emphatically than words the fire-resisting qualities of metal lath. The pictures show an elevator shaft standing up like a sentinel on a battlefield, with naught but ruins on every side. The debris is all that remained of a three-story department store in Roxbury, Mass. The elevator shaft, which penetrated the very center of the building and was consequently subjected to intense heat, was built of metal lath and plaster, and one need only to look at the photographs to be convinced of the worth of this type of construction as an efficient fire retardant.

At the corners were 4" angle irons, braced and bolted to which were attached 1" furring channel irons 12" on centers. To this furring, 24 gauge metal lath was laced and the whole plastered on both sides (excepting the top story, which was finished on the inside only) making a solid partition or wall approximately 2" in thickness.

It is interesting to note also that these pictures of the ruins were taken more than two months after the fire, after a period of severe winter weather with snow, cold, and high winds, during which time the structural strength of the shaft and the material used in its construction were still further severely tested.

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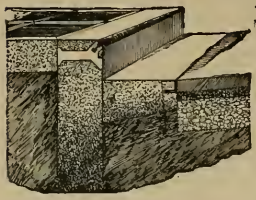

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Los Angeles Architect Enlists

Architect Fernand Parmentier, secretary of the Southern California Chapter of the American Institute of Architects, who left in August to visit his old home in Alsace, has enlisted with the Alsatian volunteers in the French army, according to letters received by friends in Los Angeles.

Writing to Architect A. C. Martin, vice-president of the Southern California Chapter, under date of Paris, August 20th, Mr. Parmentier says:

"I am enrolled with the French army and expect to be sent to the front in a few days. It is impossible for me to state at this time when I may return or when I may write again. You shall, however, hear from me at the earliest opportunity that may present itself. Kindly express my best wishes to all the chapter members."

Mr. Parmentier is a native of Alsace and his enrollment in the French army is fulfillment of his oft-expressed hope that he could some day be of service to his country.

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An editor who started about twenty years ago with only 55 cents is now worth about $100,000. His accumulation of wealth is owing to his frugality, good habits, strict attention to business and the fact that an uncle died and left him $99,000.—Editor and Publisher.

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JOHN JUTT, 46 years old, a stationary engineer, is being sought by his wife and dependent children who are alleged to have been deserted and left in great need in New York.

Information regarding his whereabouts will be greatly appreciated by the **Domestic Relations Division** of the **Department of Public Charities, No. 124 East 59th St., New York.**

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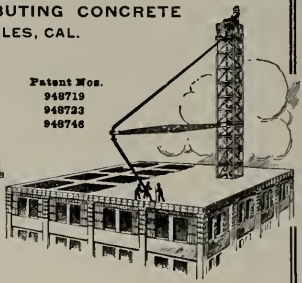

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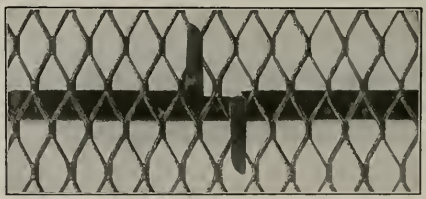

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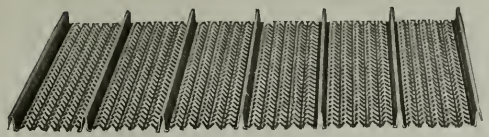

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- Florentine Art Studio, 932 Vallejo St., San Francisco.
- G. Rognier & Co., 233 R. R. Ave., San Mateo.
- The Schoenfeld Marble Co., 265 Shipley St., San Francisco.
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- Steiger Terra Cotta and Pottery Works, Mills Bldg., San Francisco.
- Independent Sewer Pipe & Terra Cotta Co., 235 S. Los Angeles St., Los Angeles.

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- H. Y. MacMeans & Co., 341 Monadnock Bldg., San Francisco.

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- Diamond Brick Co., Balboa Bldg., San Francisco.
- Gladding, McBean & Company, Crocker Bldg., San Francisco.
- Los Angeles Pressed Brick Co., Frost Bldg., Los Angeles.
- Livermore Fire Brick Co., Livermore, Cal.
- Pratt Building Material Co., Hearst Bldg., San Francisco.
- Steiger Terra Cotta & Pottery Works, Mills Bldg., San Francisco.
- Thermos Brick Co., Monadnock Bldg., San Francisco.
- United Materials Co., Crossley Bldg., San Francisco.

BRICK AND CEMENT COATING
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- Biturine Company of America, 24 California St., San Francisco.
- Trus-Con Par-Seal, made by Trussed Concrete Steel Co. (See Adv. for Pacific Coast Agents.)
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- Western Builders' Supply Co., 155 New Montgomery St., San Francisco.
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Liquid Stone Paint Co., Nevada Bank Bldg., San Francisco.
Concrete Cement Coating, manufactured by the Muralo Company. (See full-page advertisement, color insert.)
Imperial Waterproofing, manufactured by Imperial Co., 183 Stevenson St., San Francisco.
Trus-Con Par-Seal, made by Trussed Concrete Steel Co. (See Adv. for Coast agencies.)
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Medusa White Portland Cement, California Agents, the Building Material Co., Inc., 587 Monadnock Bldg., San Francisco.
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COMPRESSED AIR CLEANERS

The B. & W. Stationary Vacuum Cleaner, sold by Arthur T. Riggs, 510 Claus Spreckels Bldg., San Francisco.
Excello Stationary Vacuum Cleaner, F. W. Schaer Co., Pacific Coast Agts., Santa Maria Bldg., San Francisco.
Giant Stationary Suction Cleaner, San Francisco and Oakland.
Invincible Vacuum Cleaner, sold by R. W. Foyle, 149 New Montgomery St., San Francisco.
Tuec., mfrd. by United Electric Company, Coast Branch, General Contractors' Association, San Francisco.

CONCRETE CONSTRUCTION

American Concrete Co., Humboldt Bank Bldg., San Francisco.
Clinton Fireproofing Co., Mutual Bank Bldg., San Francisco.
McKibben & Taylor, 2125 Shattuck Ave., Berkeley.
Otto, W. H., 269 Park Ave., San Jose.
Barrett & Hilp, Sharon Bldg., San Francisco.
Foster, Vogt Co., Sharon Bldg., San Francisco.
P. A. Palmer, Monadnock Bldg., San Francisco.
Petersen, H. L., 62 Post St., San Francisco.
A. Lynch, 185 Stevenson St., San Francisco.
Ransome Concrete Co., Oakland and Sacramento.
F. J. R. Rickon, 1859 Geary St., San Francisco.

CONCRETE MIXERS

Austin Improved Cube Mixer. Factory branch, temporary office, 1235 Pine St., San Francisco.
Foote Mixers sold by Edw. R. Bacon, 40 Natoma St., San Francisco.
Smith Mixers, sold by Parrott & Co., San Francisco and Los Angeles.

CONCRETE POURING APPARATUS

Concrete Appliances Co., Los Angeles; Parrott & Co., Coast Representatives, San Francisco, Portland, Seattle.

Specify... For Plastering

HOLMES DIAMOND SANTA CRUZ LIME

PHONE SUTTER 2202

Guaranteed Against Pitting or Popping

Holmes Lime & Cement Co.
600 Postal Telegraph Bldg., San Francisco

ARCHITECTS' SPECIFICATION INDEX—*Continued*

CONCRETE REINFORCEMENT
United States Steel Products Co., San Francisco, Los Angeles, Portland and Seattle.
Clinton Welded Reinforcing System, L. A. Norris, Monadnock Bldg., San Francisco.
"Kahn System," see advertisement on page 158, this issue.
International Fabric & Cable, represented by Western Builders' Supply Co., 155 New Montgomery St., San Francisco.
Triangle Mesh Fabric. Sales Agents, Pacific Building Materials Co., 523 Market St., San Francisco.
Twisted Bars, sold by Woods & Huddart, 444 Market St., San Francisco.

CONCRETE SURFACING
"Biturine," sold by Biturine Co. of America, 24 California St., San Francisco.
"Concreta" sold by W. P. Fuller & Co., San Francisco.
Wadsworth, Howland & Co.'s Bay State Brick and Cement Coating, sold by K. N. Nason & Co., San Francisco and Los Angeles.
Liquid Stone Paint Co., Nevada Bank Bldg., San Francisco.
Glidden Liquid Cement, manufactured by Glidden Varnish Co., Whittier, Coburn Co., San Francisco, and Tibbetts-Oldfield Co., Los Angeles.
Goheen Mfg. Co., Canton O., C. W. Coburn & Co., 320 Market St., San Francisco, and A. J. Capron, Ainsworth Bldg., Portland, Oregon.
Moller & Schumann, 1023 Mission St., San Francisco.

CONTRACTORS, GENERAL
American Concrete Co., Humboldt Bank Bldg., San Francisco.
Collman & Collman, 526 Sharon Bldg., San Francisco.
Foster, Vogt Co., Sharon Bldg., San Francisco.
M. Fisher, California-Pacific Bldg., San Francisco.
Howard S. Williams, Hearst Bldg., San Francisco.
Graham & Jensen, Maskey Bldg., San Francisco.
Lester Stock, 12 Geary St., San Francisco.
Monson Bros., 1907 Bryant St., San Francisco.
John Monk, 2016 Vallejo St., San Francisco.
Ransome Concrete Co., 1218 Broadway, Oakland.
Williams Bros. & Henderson, Holbrook Bldg., San Francisco.
Burt T. Owsley, 311 Sharon Bldg., San Francisco.
Arthur W. Biggers, 112 Market St., San Francisco.
Sound Construction Co., Hearst Building, San Francisco.
Barrett & Hilp, Sharon Bldg., San Francisco.
Western Building & Engineering Co., 455 Phelan Bldg., San Francisco.

CORK FLOORING
"Linotile," manufactured by Armstrong Cork & Insulation Company. M. C. Van Fleet, agt., 120 Jessie St., San Francisco.

CORNER BAR
Dolbear Curb Bar, manufactured by American Steel Bar Co., 1034 Merchants Exchange Bldg., San Francisco.

CORNER BEAD
Union Metal Corner Bead, sold by Pacific Building Materials Co., Underwood Bldg., San Francisco.
United States Metal Products Co., 525 Market St., San Francisco.; 750 Keller St., San Francisco.

CRUSHED ROCK
Grant Gravel Co., Flat Iron Bldg., San Francisco.
Niles Rock, sold by California Building Material Company, Pacific Bldg., San Francisco.
Niles Sand, Gravel & Rock Co., Mutual Bank Bldg., San Francisco.

DAMP-PROOFING COMPOUND
Biturine Co. of America, 24 California St., San Francisco.
Glidden's Liquid Rubber, sold on Pacific Coast by Whittier, Coburn Company, San Francisco, and Tibbetts-Oldfield Co., Los Angeles.
Imperial Co., 183 Stevenson St., San Francisco.
Lithoid Product Co., Merchants Exchange Bldg., San Francisco.
Trus-Con Damp Proofing. (See advertisement of Trussed Concrete Steel Company for Coast agencies.)
"Pabco" Damp Proofing Compound, sold by Paraffine Paint Co., 34 First St., San Francisco.
Liquid Stone Paint Co., Hearst Bldg., San Francisco.
Wadsworth, Howland & Co., Inc., 84 Washington St., Boston. (See Adv. for Coast agencies.)

DOOR HANGERS
McCabe Hanger Mfg. Co., New York, N. Y.
Pitcher Hanger, sold by National Lumber Co., Fifth and Bryant Sts., San Francisco.
Reliance Hanger, sold by Sartorius Co., San Francisco; D. F. Fryer & Co., Louis R. Bedell, Los Angeles, and Portland Wire & Iron Works.

DRINKING FOUNTAINS
Haws Sanitary Fountain, 1808 Harmon St., Berkeley, and C. F. Weber & Co., San Francisco and Los Angeles.
N. O. Nelson Mfg. Co., 978 Howard St., San Francisco.
Crane Company, San Francisco, Oakland, and Los Angeles.

DUMB WAITERS
Spencer Elevator Company, 173 Beale St., San Francisco.
Burdett-Rowntree Mfg. Co., Underwood Bldg., San Francisco.

ELECTRICAL CONTRACTORS
Butte Engineering Co., 683 Howard St., San Francisco.
Central Electric Co., 185 Stevenson St., San Francisco.
Scott Co., Inc., 243 Minna St., San Francisco.
Pacific Fire Extinguisher Co., 507 Montgomery St., San Francisco.

ELECTRICAL ENGINEERS
Albert E. Noble, 173 Jessie St., San Francisco.
Chas. T. Phillips, Pacific Bldg., San Francisco.

ELECTRIC STEAM HEATERS
Automatic Electric Heating Company, 2023 Market St., San Francisco.

ELECTRIC FIXTURES
Roberts Manufacturing Company, 663 Mission St., San Francisco.

ELECTRIC PLATE WARMER
The Prometheus Electric Plate Warmer for residences, clubs, hotels, etc. Sold by M. E. Hammond, Humboldt Bank Bldg., San Francisco.

MORTENSON CONSTRUCTION CO.
CONTRACTORS FOR STRUCTURAL STEEL AND IRON
H. MORTENSON, PRES. CHAS. G. MORTENSON VICE-PRES. AND MGR.
OFFICE AND SHOPS: CORNER 19TH AND INDIANA STREETS
PHONES: MISSION 6033—HOME M 3916 SAN FRANCISCO, CAL.

"FIBRESTONE"

SANITARY FLOORING, WAINSCOT AND BASE. Laid Exclusively by
FIBRESTONE & ROOFING CO., 971 Howard St. San Francisco Tel. Sutter 339

ARCHITECTS' SPECIFICATION INDEX—*Continued*

ELEVATORS
Otis Elevator Company, Stockton and North Point, San Francisco.
Spencer Elevator Company, 126 Beale St., San Francisco.
San Francisco Elevator Co., 860 Folsom St., San Francisco.
Pacific Gurney Elevator Co., 186 Fifth St., San Francisco.
Van Emon Elevator Co., Natoma St., San Francisco.

ELEVATORS, SIGNALS, FLASHLIGHTS AND DIAL INDICATORS
Elevator Supply & Repair Co., Underwood Bldg., San Francisco

ENGINEERS
F. J. Amweg, 700 Marston Bldg., San Francisco.
W. W. Breite, Clunie Bldg., San Francisco.
L. M. Hausmann, Sharon Bldg., San Francisco.
Chas. T. Phillips, Pacific Bldg., San Francisco.
Hunter & Hudson, Rialto Bldg., San Francisco.

EXIT DEVICES
Von Duprin Self-Releasing Fire Exit Devices, manufactured by Vonnegut Hardware Co. (See Adv. for Coast Distributors.)

EXPRESS CALL SYSTEM
Elevator Supply & Repair Co., Underwood Bldg., San Francisco.

FIRE EXIT DEVICES
Von Duprin Self-Releasing Fire Exit Devices, Vonnegut Hardware Co. (See Adv. for Coast Agencies.)

FIRE ESCAPES
Barnett Iron Works, Fresno, Cal.
Pacific Structural Iron Works, Structural Iron and Steel, Fire Escapes, etc. Phone Market 1374; Home J. 3435. 370-84 Tenth St., San Francisco.
Western Iron Works, 141 Beale St., San Francisco.

FIRE EXTINGUISHERS
Scott Company, 243 Minna St., San Francisco.
Pacific Fire Extinguisher Co., 507 Montgomery St., San Francisco.

FIRE BRICK
Livermore Fire Brick Co., Livermore, Cal.

FIREPLACE DAMPER
Head, Throat and Damper for open fireplaces, Colonial Fireplace Co., Chicago. (See advertisement for Coast agencies.)

FIREPROOFING AND PARTITIONS
Gladding, McBean & Co., Crocker Bldg., San Francisco.
Los Angeles Pressed Brick Co., Frost Bldg., Los Angeles.

FIREPROOF PAINT
Liquid Stone Paint Co., Nevada Bank Bldg., San Francisco.
Glidden Products, sold by Whittier-Coburn Co., San Francisco, and Tibbetts-Oldfield Co., Los Angeles.

FIXTURES—BANK, OFFICE, STORE, ETC.
A. J. Forbes & Son, 1530 Filbert St., San Francisco.
Fink & Schindler, 218 13th St., San Francisco.
C. F. Weber & Co., 365 Market St., San Francisco and 210 N. Main St., Los Angeles, Cal.
T. H. Meek Co., 1157 Mission St., San Francisco.

FLOOR VARNISH
Bass-Hueter and San Francisco Pioneer Varnish Works, 816 Mission St., San Francisco.
R. N. Nason & Co., 151 Potrero Ave., San Francisco.
Standard Varnish Works, Chicago, New York and San Francisco.
Moller & Schumann Co., 1022 Mission St., San Francisco.
Glidden Products, sold by Whittier-Coburn Co., San Francisco, and Tibbetts-Oldfield Co., Los Angeles.

FLOORING—MAGNESITE
Fibrestone & Roofing Co., 971 Howard St., San Francisco.

FLUMES
California Corrugated Culvert Co., West Berkeley, Cal.

GARAGE EQUIPMENT
Bowser Gasoline Tanks and Outfit, Bowser & Co., 612 Howard St., San Francisco.

GAS AND ELECTRIC FIXTURES
Roberts Manufacturing Company, San Francisco and Oakland.

GAS GENERATORS
Utility Gas Generator Co., 340 Sansome St., San Francisco.

GLASS
W. P. Fuller & Company, all principal Coast cities.
Whittier-Coburn Co., Howard & Beale Sts., San Francisco.

GRANITE
California Granite Co., Sharon Bldg., San Francisco.

GRAVEL, SAND AND CRUSHED ROCK
Bay Development Co., 153 Berry St., San Francisco
California Building Material Co., Pacific Bldg., San Francisco.
Del Monte White Sand, sold by Pacific Improvement Co., Crocker Bldg., San Francisco.
Pratt Building Material Co., Hearst Bldg., San Francisco.
Grant Gravel Co., Flatiron Bldg., San Francisco.
Niles Sand, Rock & Gravel Co., 971 Howard St., San Francisco.

GRAVITY CHUTES
Gravity Spiral Chutes, sold by G. E. Sturgis' Supply House, 602 Mission St., San Francisco.

"White-Steel" Medicine Cabinets and Mirrors are the last word in Sanitary Bathroom Equipment. See Sweet's 1914 Catalog, Pages 1054-1055 or write for full information.

"WHITE-STEEL" SANITARY FURNITURE CO.
Grand Rapids, Michigan

Northern California
Johnson-Locke Mercantile Co.
San Francisco, Calif.

Southern California
H. R. Boynton Company
Los Angeles, Calif.

CLARENCE E. MUSTO, Pres. JOSEPH B. KEENAN, Vice-Pres GUIDO J. MUSTO, Sec'y & Treas.

JOSEPH MUSTO SONS-KEENAN CO.

Phone Franklin —6365— **MARBLE** OFFICE AND MILLS: 535-565 North Point St., SAN FRANCISCO, CAL.

ARCHITECTS' SPECIFICATION INDEX—*Continued*

HARDWALL PLASTER
Henry Cowell Lime & Cement Co., San Francisco.
American Keene Cement Co., 333 Monadnock Bldg., San Francisco.

HARDWARE
Russwin Hardware, Joost Bros., San Francisco.
Pacific Hardware & Steel Company, San Francisco, Oakland, Berkeley, Los Angeles and San Diego.
Sargent's Hardware, sold by Bennett Bros., 514 Market St., San Francisco.
Western Brass Mfg. Co., 217 Tehama St., S. F.

HARDWOOD FLOORING
Parrott & Co., 320 California St., San Francisco
White Bros., Cor. Fifth and Brannan Sts., San Francisco.
Hardwood Interior Co., 554 Bryant St., San Francisco.

HARDWOOD LUMBER
Dieckmann Hardwood Co., Beach and Taylor Sts., San Francisco.
Parrott & Co., 320 California St., San Francisco.
White Bros., Cor. Fifth and Brannan Sts., San Francisco.

HEATERS—AUTOMATIC
Pittsburg Water Heater Co., 237 Powell St., San Francisco.
Hoffman Heaters, factory branch, 397 Sutter St., San Francisco.

HEATING AND VENTILATING
American Heat & Power Co., Oakland, Cal.
J. M. Boscus, 975 Howard St., San Francisco.
Fess System Co., 220 Natoma St., San Francisco.
Mangrum & Otter, Inc., 507 Mission St., San Francisco.
Scott Company, 243 Minna St., San Francisco.
Wittman, Lyman & Co., 341 Minna St., San Francisco.
Pacific Fire Extinguisher Co., 507 Montgomery St., San Francisco.
Petersen-James Co., 710 Larkin St., San Francisco.

HOLLOW BLOCKS
Denison Hollow Interlocking Blocks, 310 Ochsner Bldg., Sacramento, and Chamber of Commerce Bldg., Portland.

INSPECTIONS AND TESTS
Robert W. Hunt & Co., 251 Kearny St., San Francisco.

IRON PAINT
Gohcen Mfg. Company, Canton, Ohio.

JOIST HANGERS
Western Builders' Supply Co., 155 New Montgomery St., San Francisco.

KEENE CEMENT
American Keene Cement Co., Monadnock Bldg., San Francisco.

LIGHTING FIXTURES
Roberts Manufacturing Co., 663 Mission St., San Francisco.
Bird-Rymer Co., Oakland, Cal.

LIME
Holmes Lime and Cement Co., Postal Telegraph Bldg., San Francisco.
Henry Cowell Lime & Cement Co., 9 Main St., San Francisco.

LIGHT, HEAT AND POWER
Pacific Gas & Elec. Co., 445 Sutter St., San Francisco.

LUMBER
Dudfield Lumber Co., Palo Alto, Cal.
Sunset Lumber Co., Oakland, Cal.
Santa Fe Lumber Co., Seventeenth and De Haro Sts., San Francisco.
E. K. Wood Lumber Company, East Oakland, California.

MAIL CHUTES
Cutler Mail Chute Co., Rochester, N. Y. (See Adv. on page 38 for Coast representatives.)

MANTELS
Mangrum & Otter, 561 Mission St., San Francisco.

MARBLE
Columbia Marble Co., 268 Market St., San Francisco.
Joseph Musto Sons-Keenan Co., 535 North Point St., San Francisco.

MEDICINE CABINETS
White Steel Sanitary Furniture Co., rep. by Johnson-Locke Mercantile Co., San Francisco.

METAL AND STEEL LATH
"Steelcrete" Expanded Metal Lath, sold by Holloway Expanded Metal Company, Monadnock Bldg., San Francisco.
L. A. Norris & Co., Monadnock Bldg., San Francisco.
Pratt Building Material Co., Hearst Bldg., San Francisco.

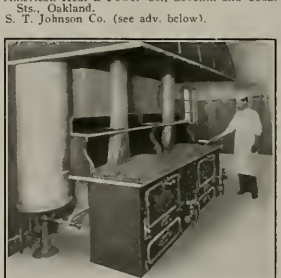
METAL CEILINGS
San Francisco Metal Stamping & Corrugating Co., 2269 Folsom St., San Francisco.

METAL DOORS AND WINDOWS
U. S. Metal Products Co., 525 Market St., San Francisco.
Dahlstrom Metallic Door Co., Western office, with M. G. West Co., 353 Market St., San Francisco.

METAL FURNITURE
M. G. West Co., 353 Market St., San Francisco.
Chas. M. Finch, 311 Board of Trade Bldg., San Francisco.

METAL SHINGLES
Meurer Bros., 630 Third St., San Francisco.
San Francisco Metal Stamping & Corrugating Co., 2269 Folsom St., San Francisco.

OIL BURNERS
American Heat & Power Co., Seventh and Cedar Sts., Oakland.
S. T. Johnson Co. (see adv. below).



Crude Oil Burners Operating Kitchen Ranges in Government Barracks at Fort Winfield Scott

OIL BURNERS
Modern EQUIPMENTS for Cooking and Heating Plants
S. T. JOHNSON CO.
1337 MISSION ST. SAN FRANCISCO
945 GRACE AVE. OAKLAND

SPENCER ELEVATOR COMPANY
(FORMERLY WELLS AND SPENCER MACHINE CO.)
126-128 BEALE STREET
TELEPHONE KEARNY 664 SAN FRANCISCO

ARCHITECTS' SPECIFICATION INDEX—*Continued*

OIL BURNERS—Continued.
Fess System Co., 220 Natoma St., San Francisco.
T. P. Jarvis Crude Oil Burner Co., 275 Connecticut St., San Francisco.

ORNAMENTAL IRON AND BRONZE
Brode Iron Works, 31-37 Hawthorne St., San Francisco.
California Artistic Metal & Wire Co., 349 Seventh St., San Francisco.
J. G. Braun, Chicago and New York.
Ralston Iron Works, 20th and Indiana Sts., San Francisco.
Monarch Iron Works, 1165 Howard St., San Francisco.
C. J. Hillard Company, Inc., 19th and Minnesota Sts., Sain Francisco.
Shreiber & Sons Co., represented by Western Builders Supply Co., San Francisco.
West Coast Wire & Iron Works, 861-863 Howard St., San Francisco.
Vulcan Iron Works, San Francisco.

PAINTING AND DECORATING
D. Zelinsky, 564 Eddy St., San Francisco.
Horace W. Tyrell, 1707 38th Ave., Oakland.
Robert Swan, 1133 E. 12th St., Oakland.

PAINT FOR BRIDGES
Biturine Company of America, 24 California St., San Francisco.

PAINT FOR STEEL STRUCTURES
"Biturine," sold by Biturine Co. of America, 24 California St., San Francisco.
Carbonizing Coating, made by Goheen Mfg. Co., Canton, Ohio.
Trus-Con Bar-Ox, Trussed Concrete Steel Co. (See Adv. for Coast agencies.)
Glidden's Acid Proof Coating, sold on Pacific Coast by Whittier, Coburn Company, San Francisco, and Tibbetts-Oldfield Co., Los Angeles.

PAINT FOR CEMENT
Bay State Brick and Cement Coating, made by Wadsworth, Howland & Co. (Inc.). (See Adv. in this issue for Pacific Coast agents.)
"Biturine," sold by Buturine Co. of America, 24 California St., San Francisco.
Goheen Mfg. Co., represented by C. W. Coburn & Co., 320 Market St., San Francisco, and A. J. Capron, Ainsworth Bldg., Portland.
Trus-Con Stone Tex., Trussed Concrete Steel Co. (See Adv. for Coast agencies.)
Liquid Stone Paint Co., Nevada Bank Bldg., San Francisco, Los Angeles, and San Diego.
Glidden's Liquid Cement, sold on Pacific Coast by Whittier, Coburn Company, San Francisco and Tibbetts-Oldfield Co., Los Angeles.
Concreto Cement Coating, manufactured by the Muralo company. (See color insert for Coast distributors.)
Moller & Schumann Co., Hilo Varnishes, 1022 Mission St., San Francisco.
Samuel Cabot Mfg. Co., Boston, Mass., agencies in San Francisco, Oakland, Los Angeles, Portland, Tacoma and Spokane.
"Technola," a cement paint, sold by C. Roman, San Francisco.

PAINTS, OILS, ETC.
Concreto Cement Coating, manufactured by the Muralo company. (See color insert for Coast distributors.)
Bass-Heuter Paint Co., Mission, near Fourth St., San Francisco.
Whittier-Coburn Co., Howard and Beale Sts., San Francisco.
"Biturine," sold by Biturine Co. of America, 24 California St., San Francisco.
Heath & Milligan Mfg. Co., 9-15 Fremont St., San Francisco.
Glidden Varnish Co., Cleveland, Ohio, represented by Whittier-Coburn Co., San Francisco and Tibbetts-Oldfield Co., Los Angeles.
Goheen Mfg. Co., Canton, Ohio.
Moller & Schumann Co., 1022 Mission St., San Francisco.
Paraffine Paint Co., 38-40 First St., San Francisco.
W. P. Fuller & Co., all principal Coast cities.
R. N. Nason Co., San Francisco.
Standard Varnish Works, 113 Front St., San Francisco.

PAVING BRICK
California Brick Company, Phelan Bldg., San Francisco.

PHOTO ENGRAVING
California Photo Engraving Co., 121 Second St., San Francisco.

PHOTOGRAPHY
R. J. Waters Co., 717 Market St., San Francisco.

PIPE—VITRIFIED SALT GLAZED TERRA COTTA
Gladding, McBean & Co., Crocker Bldg., San Francisco.
Pacific Sewer Pipe Co., I. W. Hellman Bldg., Los Angeles.
Pratt Building Material Co., Hearst Bldg., San Francisco.
Steiger Terra Cotta and Pottery Works, Mills Bldg., San Francisco.

PLASTER CONTRACTORS
A. Knowles, 985 Folsom St., San Francisco.

PLUMBERS' MARBLE HARDWARE
Western Brass Mfg. Co., 217 Tehama St., S. F.

PLUMBING
Boscus Bros., 975 Howard St., San Francisco.
Scott Co., Inc., 243 Minna St., San Francisco.
Peterson-James Co., 710 Larkin St., San Francisco.
Wittman, Lyman & Co., 341 Minna St., San Francisco.
Alex Coleman, 706 Ellis St., San Francisco.

PLUMBING FIXTURES, MATERIALS, ETC.
Crane Co., Second and Brannan Sts., San Francisco.
N. O. Nelson Mfg. Co., 978 Howard St., San Francisco.
California Steam Plumbing Supply Co., 671 Fifth St., San Francisco.
J. L. Mott Iron Works, D. H. Gulick, selling agent, 135 Kearny St., San Francisco.
Western States Porcelain Co., San Pablo, Cal.

POTTERY
Steiger Terra Cotta and Pottery Works, Mills Bldg., San Francisco.

HERE IT IS **MADE IN CALIFORNIA, TOO!**
A High Class Washable Paint for Inside Walls.
OPAQUE FLAT FINISH
Less material required to cover surface than any similar product on the market.
R. N. NASON & CO., 151-161 Potrero Avenue 54-56 Pine Street **SAN FRANCISCO**

PORTLAND SAN FRANCISCO SEATTLE

Sound Construction and Engineering Co.

Incorporated

J. T. WALSH, Engr. and Mgr.

HEARST BUILDING, SAN FRANCISCO, CAL.

ARCHITECTS' SPECIFICATION INDEX—*Continued*

PULLEYS, SHAFTING, GEARS, ETC.
Meese & Gottfried Co., San Francisco, Seattle, Portland and Los Angeles.

PUMPS
Chicago Pump Company, 612 Howard street, San Francisco.

REFRIGERATORS
McCray Refrigerators, sold by Nathan Dohrmann Co., Geary and Stockton Sts., San Francisco.
Vulcan Iron Works, San Francisco.

REVOLVING DOORS
Van Kennel Doors, sold by U. S. Metal Products Co., 525 Market St., San Francisco.

ROCK BREAKING MACHINERY
Vulcan Iron Works, Francisco and Kearny Sts., San Francisco.

ROLLING DOORS, SHUTTERS, PARTITIONS, ETC.
Pacific Building Materials Co., 523 Market St., San Francisco.
C. F. Weber & Co., 365 Market St., San Francisco.
Union Blind and Ladder Company, manufacturers of the Acme rolling partitions for churches and schools, 3535 Peralta St., Oakland.
Wilson's Steel Rolling Doors, U. S. Metal Products Co., San Francisco and Los Angeles.

ROOFING AND ROOFING MATERIALS
Biturine Co. of America, 24 California St., San Francisco.
Grant Gravel Co., Flat Iron Bldg., San Francisco.
Firestone & Roofing Co., 971 Howard St., San Francisco.
National Roofing Company, Broadway, Oakland.
"Ruberoid," manufactured by Paraffine Paint Co., San Francisco.
Mackenzie Roof Co., 425 15th St., Oakland.
United Materials Co., Crossley Bldg., San Francisco.

ROOFING TIN
American Sheet & Tin Plate Co., Pacific Coast representatives, U. S. Steel Products Co., San Francisco, Los Angeles, Portland and Seattle.
Meurer Bros., A. H. MacDonald, agent, 630 Third St., San Francisco.

SAFES, VAULTS, BANK EQUIPMENT
M. G. West Co., 353 Market St., San Francisco.

SAFETY TREADS
American Mason Safety Tread. (See Adv. on page 147 for Coast agents.)
Universal Safety Tread Co., represented by Pacific Building Materials Co., 523 Market St., San Francisco.

SANITARY DRINKING FOUNTAINS
N. O. Nelson Mfg. Co., 978 Howard St., San Francisco.
Haws' Sanitary Drinking Faucet Co., 1808 Harmon St., Berkeley.

SASH CORD
Regal Sash Cord, Louisville Selling Co. represented on Pacific Coast by Baker & Hamilton.
Samson Cordage Works, manufacturers of Solid Braided Cords and Cotton Twines, 88 Broad St., Boston, Mass.

SCENIC PAINTING—DROP CURTAINS, ETC.
The Edwin H. Flagg Scenic Co., 1638 Long Beach Ave., Los Angeles.

SCHOOL FURNITURE AND SUPPLIES
C. F. Weber & Co., 365 Market St., San Francisco; 512 S. Broadway, Los Angeles.

SCULPTORS
Western Sculptors, 533-535 Turk St., San Francisco.

SEWAGE EJECTORS
Chicago Pump Co., represented by Telephone Electric Equipment Co., 612 Howard street, San Francisco.

SHEATHING AND SOUND DEADENING
Samuel Cabot Mfg. Co., Boston, Mass., agencies in San Francisco, Oakland, Los Angeles, Portland, Tacoma and Spokane.

SHEET METAL WORK, SKYLIGHTS, ETC.
Berger Mfg. Co., 1120 Mission St., San Francisco.
U. S. Metal Products Co., 525 Market St., San Francisco.

SHINGLE STAINS
Cabot's Creosote Stains, sold by Waterhouse & Price, San Francisco, Los Angeles and Portland.

STEEL AND IRON—STRUCTURAL
Burnett Iron Works, Fresno, Cal.
Central Iron Works, 621 Florida St., San Francisco.
Dyer Bros., 17th and Kansas Sts., San Francisco.
Judson Manufacturing Co., 819 Folsom St., San Francisco.
Brode Iron Works, 31 Hawthorne St., San Francisco.
Mortenson Construction Co., 19th and Indiana Sts., San Francisco.
J. L. Mott Iron Works, D. H. Gulick, agents, 135 Kearny St., San Francisco.
Pacific Rolling Mills, 17th and Mississippi Sts., San Francisco.
Pacific Structural Iron Works, Structural Iron and Steel, Fire Escapes, etc. Phone Market 1374; Home, J. 3435, 370-84 Tenth St., San Francisco.
Ralston Iron Works, Twentieth and Indiana Sts., San Francisco.
U. S. Steel Products Co., Rialto Bldg., San Francisco.
Schreiber & Sons Co., represented by Western Builders Supply Co., S. F.
Vulcan Iron Works, San Francisco.
Western Iron Works, 141 Beale St., San Francisco.
Woods & Huddart, 444 Market St., San Francisco.

CALIFORNIA ARTISTIC METAL & WIRE CO.

J. T. McCORMICK - President

ORNAMENTAL IRON & BRONZE WORK

349 - 365 SEVENTH ST. SAN FRANCISCO.

TELEPHONE: MARKET 2162

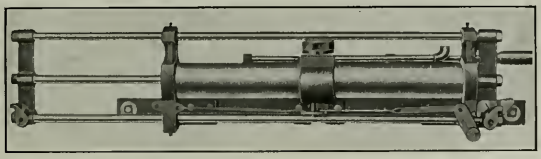
SHERWOOD BIRD JOHN A. RYMER

Bird-Rymer Co.

Lighting Fixtures

MAPLE HALL, 332 - 14th STREET
OAKLAND, CALIFORNIA

Factory 1727 E. 12th Street Telephone Oakland 1560



Burdett Rowntree Pneumatic Door Operating Device

BURDETT ROWNTREE MFG. CO.

Dumbwaiters
Door Operating Devices
Elevator Interlocks

323 Underwood Building,
525 Market Street
Phone Douglas 2898
San Francisco, - - Cal.

Norton Elevator Door Closer

ELEVATOR SUPPLY & REPAIR CO.

Elevator Signals
Elevator Accessories
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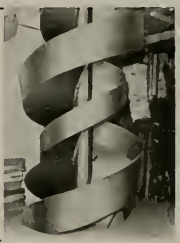

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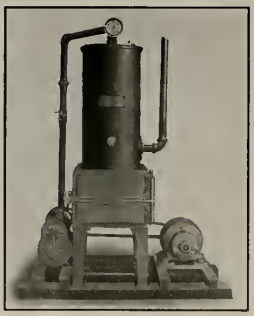

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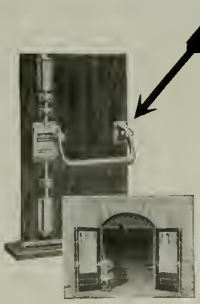

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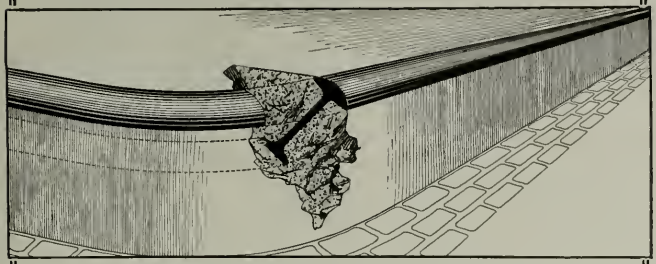

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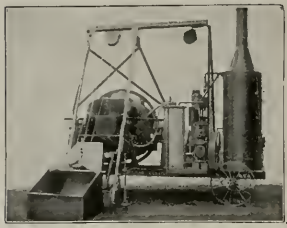

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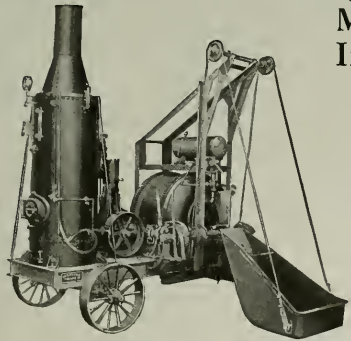

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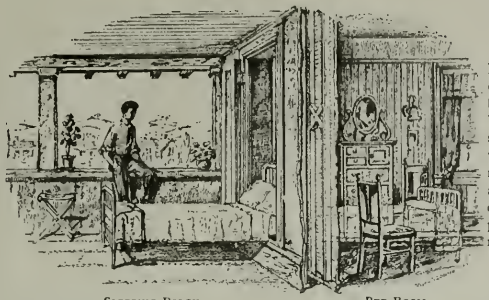

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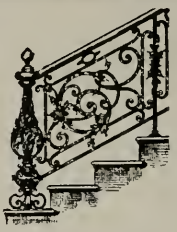

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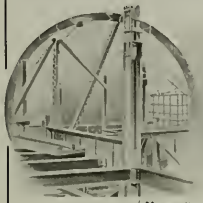

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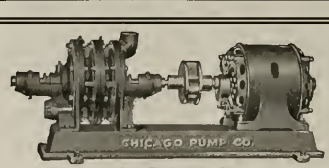

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Frontispiece
The Architect and Engineer
of California
for October, 1914

RESIDENCE OF SENATOR A. H. BREED
PIEDMONT, CALIFORNIA
W. H. RATCLIFF, JR., ARCHITECT

THE
Architect and Engineer
Of California
Pacific Coast States

VOL. XXXVIII. OCTOBER, 1914 No. 3.

HOUSE OF MR. T. M. SHEARMAN, BERKELEY
W. H. Ratcliff, Jr., Architect

Some Recent Residences and Other Work by Walter H. Ratcliff, Jr.

By FREDERICK JENNINGS

ASK ten architects who have achieved fame as designers of homes if they specialize in domestic architecture and nine of them will tell you they do not. The tenth one may admit he has built a few nice houses, but he doesn't care to be classed as a "specialist," and he will tell you so frankly.

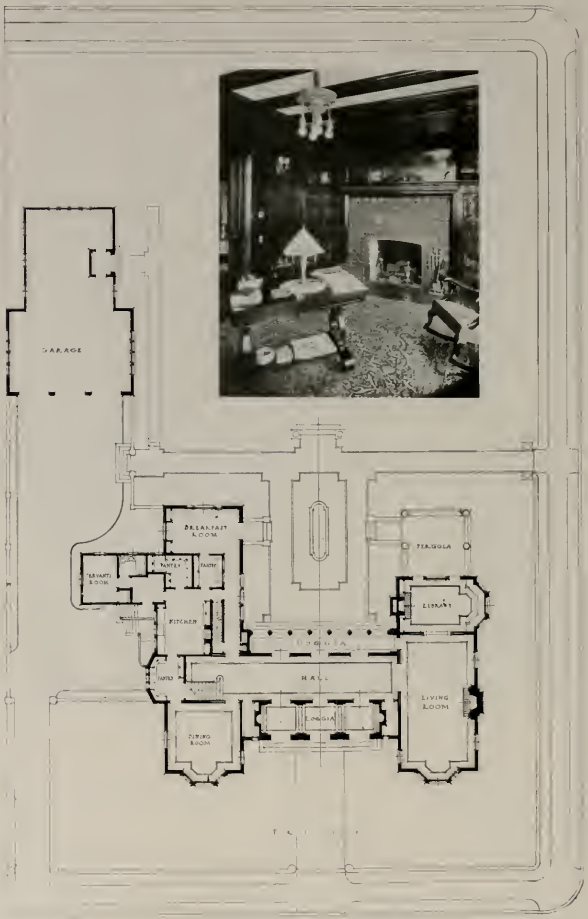
As much as some architects would like to keep their residence work in the background, it is an admitted fact that the fellow who plans houses and plans them well, no matter how many commercial structures, churches or theaters he may build, is bound to be recognized by the profession, and the public just naturally turns to him for advice. The public, by the way, is not slow to discover a man's ability, especially along the lines of residence work. The average home builder with means wants the best plan he can get and the most competent service obtainable. And so the architect who would avoid the distinction—honor, some call it—of being an expert, just naturally becomes a specialist, whether he wishes to or not.

"The country house in California is a young and tender plant," writes Herbert D. Croly, but young as it may be, its numbers are greater in proportion to population than anywhere else in the country. By country house we mean the suburban home, the house away from commercial life.

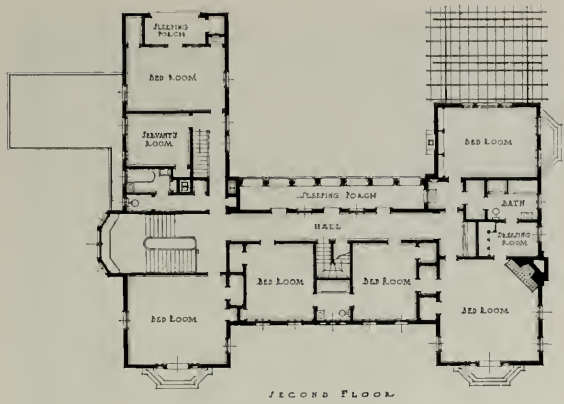
Pasadena, in Southern California is a city of country homes, and when you mention Pasadena, you just naturally call to mind a Green & Green house—generally a long, low restful structure, possessing the true bungalow feeling. Redwood shakes or cedar shingles are invariably to be found in houses designed by this firm. Wide cornice roofs with either brick or

DETAIL OF COURT
RESIDENCE OF SENATOR A. H. BREED
PIEDMONT, CALIFORNIA
W. H. RATCLIFF, JR., ARCHITECT

DETAIL OF LOGGIA
RESIDENCE OF SENATOR A. H. BREED
PIEDMONT, CALIFORNIA



INTERIOR VIEW AND FIRST FLOOR PLAN
RESIDENCE OF SENATOR A. H. BREED, PIEDMONT
W. H. RATCLIFF, JR., ARCHITECT



RESIDENCE OF SENATOR A. H. BREED, PIEDMONT
W. H. Ratcliff, Jr., Architect

cobblestone chimneys add snap to the Green house that in most other homes, give the effect of over-embellishment. In Los Angeles, the names of Hunt & Burns, Myron Hunt, Elmer Grey, and Robert D. Farquahar are familiar alike to country house builders and members of the profession. San Diego has Irving J. Gill, an architect who has done wonders in straight line stucco work—returning, as it were, to architectural first principles—the line, square and circle. In domestic architecture around San Francisco, the work of Louis C. Mullgardt stands in a class by itself. Others who are famed for their residence work, whether they admit it or not, are Albert Farr, Louis P. Hobart, Edgar Mathews, William Knowles and Bernard Maybeck. In Berkeley you will hear about W. H. Ratcliff, Jr., but Mr. Ratcliff, like some of the other men whose names I have just mentioned, does not enthuse when you speak to him about his tendency towards domestic architecture.

"It's bread and butter with me," is his rather frank way of expressing, or rather excusing himself. To this he adds a consoling paragraph:

"You can't design a million-dollar office building or a monumental bank structure if you don't get the commission, can you?"

We think Mr. Ratcliff could design either or both—better, possibly, than some who have been commissioned to build such structures, but in the absence of any examples, we turn to what has actually been accomplished by him, and the results are gratifying, to say the least.

Passing by, for the present, extended reference to the Elks Club building, which really is one of Mr. Ratcliff's best efforts, also his numerous apartment houses, it would be doing him an injustice to overlook his Commercial Club, now in course of construction on the top floor of the Merchants Exchange building in San Francisco. No better arranged club

STAIRCASE, RESIDENCE OF SENATOR A. H. BREED, PIEDMONT, CALIFORNIA

rooms will be found on the Coast, practically two entire floors of this great building having been taken over for the club's exclusive use. The interior finish will be of oak, the entire scheme being worked out in English Tudor. Access to the fourteenth floor will be by means of a grand staircase, the elevator stopping at the entrance to the club on the thirteenth floor. Large view windows, from which may be seen the entire city and bay, will be features of the dining and reading rooms. The accompanying plates give only a general idea of the scope of this $120,000 undertaking.

Referring to Mr. Ratcliff's residence work, the few examples given show a true appreciation of home life—practical floor plans, ideally arranged for comfort and convenience. The architecture, in most cases, smacks of the

PENCIL SKETCH, COTTAGE FOR MISS HEAD, BERKELEY
W. H. Ratcliff, Jr., Architect

COTTAGE FOR MISS HEAD, BERKELEY
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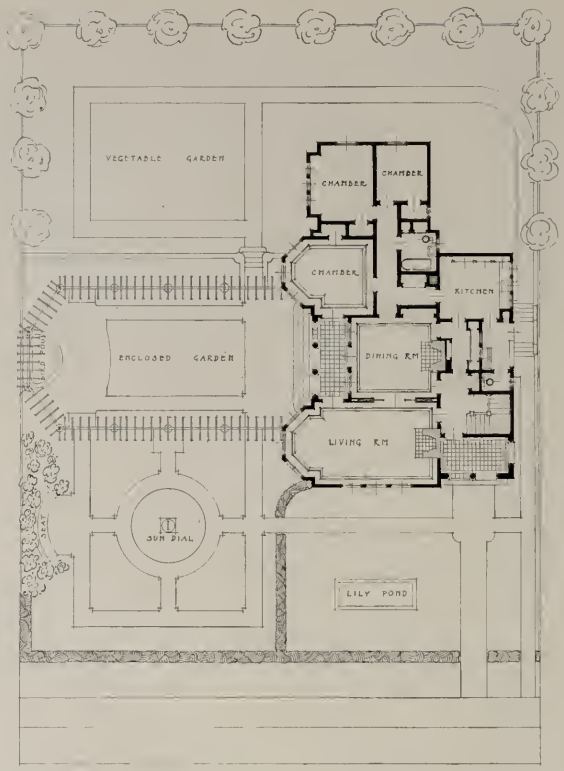

FIRST FLOOR AND GARDEN PLAN
COTTAGE FOR MISS HEAD, BERKELEY
W. H. RATCLIFF, JR., ARCHITECT

DINING ROOM, COTTAGE FOR MISS HEAD, BERKELEY
W. H. Ratcliff, Jr., Architect

COURT, RESIDENCE FOR MR. T. M. SHEARMAN, BERKELEY
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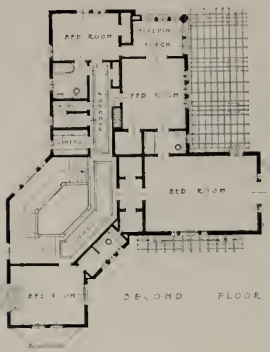
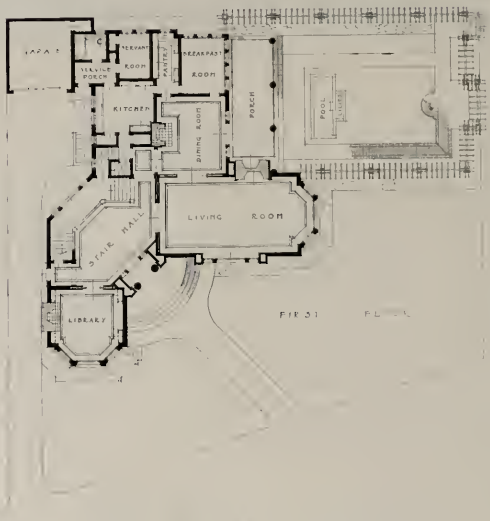




FLOOR PLANS, RESIDENCE OF MR. T. M. SHEARMAN, BERKELEY
Plumbing by George Stoddard.

LIVING ROOM, RESIDENCE OF MR. T. M. SHEARMAN, BERKELEY
W. H. Ratcliff, Jr., Architect

DETAIL OF DINING ROOM, RESIDENCE OF MR. T. M. SHEARMAN, BERKELEY
W. H. Ratcliff, Jr., Architect

STAIRCASE, RESIDENCE OF MR. T. M. SHEARMAN, BERKELEY

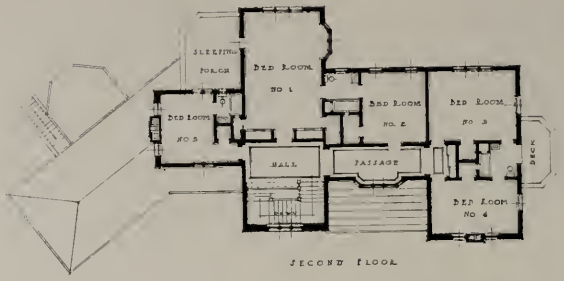
true English feeling, while apparently as much care is given to the garden and landscape effects as to the house itself. And this is as strong a characteristic of Mr. Ratcliff's residence work as it is a failing with some of his brother architects.

Mr. Ratcliff studied in the School of Architecture at the University of California, and later attended the British School in Rome. He also worked under John Galen Howard and when Architect Henry A. Schulze was in active practice, Mr. Ratcliff was a member of his working staff, and later he became associated with Architect Alfred Henry Jacobs of San Francisco.

Mr. Ratcliff is a member of San Francisco Chapter, American Institute of Architects.

RESIDENCE OF MR. E. A. NICKERSON, BERKELEY
W. H. Ratcliff, Jr., Architect

FIRST FLOOR PLAN, RESIDENCE OF MR. E. A. NICKERSON, BERKELEY
W. H. Ratcliff, Jr., Architect

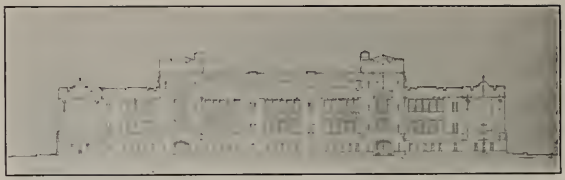


RESIDENCE OF MR. E. A. NICKERSON, BERKELEY

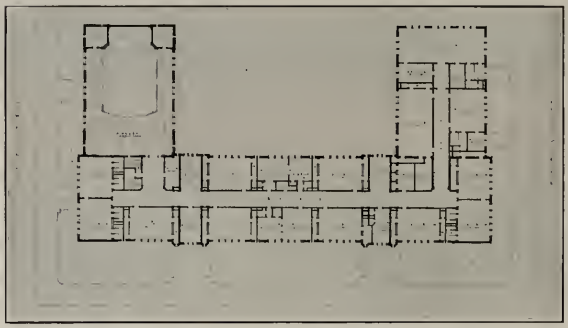
GLEN GARRY APARTMENTS, BERKELEY
W. H. Ratcliff, Jr., Architect

CAMBRIDGE APARTMENTS, BERKELEY, UNDER CONSTRUCTION
W. H. Ratcliff, Jr., Architect

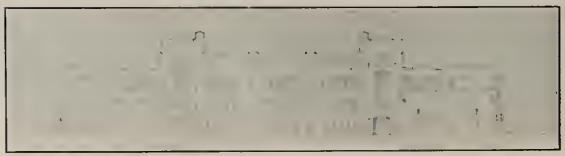
CHANNING APARTMENTS, BERKELEY, CALIFORNIA
W. H. Ratcliff, Jr., Architect



FRONT ELEVATION SACRAMENTO SCHOOL. AWARDED THIRD PRIZE IN COMPETITION
W. H. Ratcliff, Jr., Architect, and H. G. Simpson, Associate



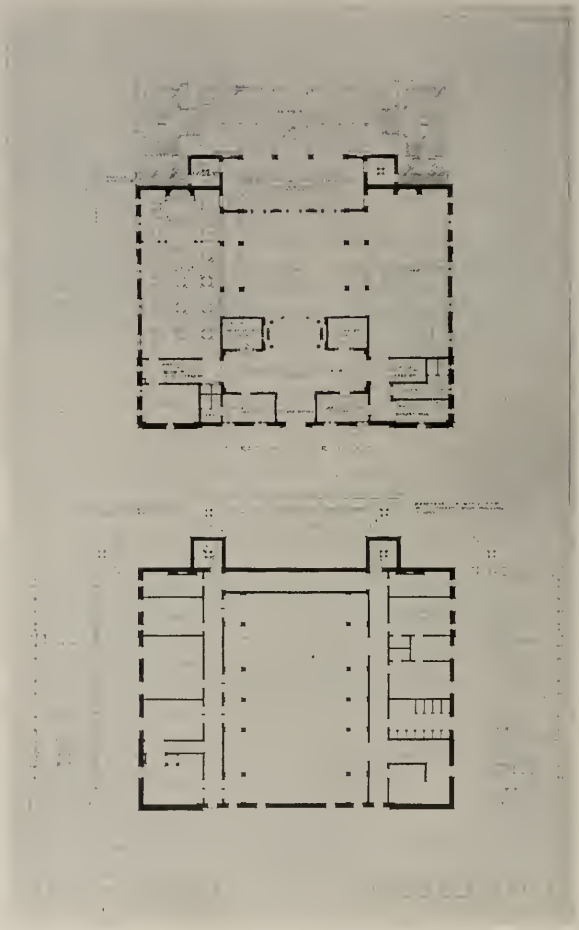
FIRST FLOOR PLAN SACRAMENTO SCHOOL



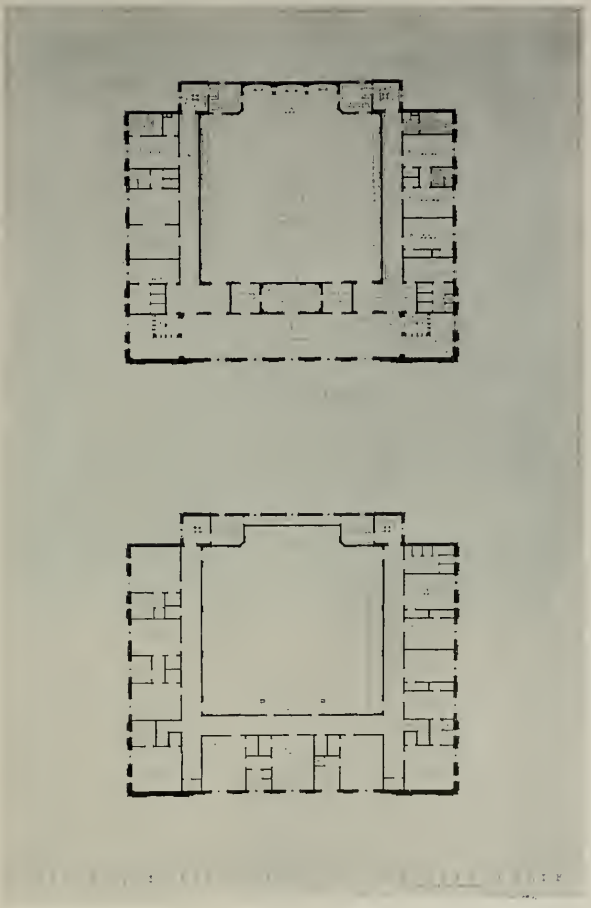
REAR ELEVATION SACRAMENTO SCHOOL

PERSPECTIVE, ELKS' CLUB BUILDING, BERKELEY
W. H. Ratcliff, Jr., Architect
Heating and Ventilating by George Stoddard, Berkeley

ELKS' CLUB BUILDING, BERKELEY
Millwork, Sash and Doors furnished by Burnham, Standeford Co., Oakland



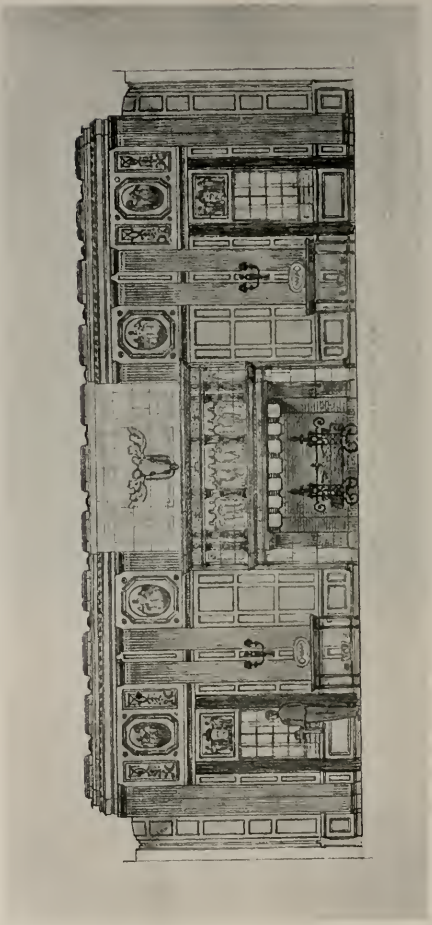
BASEMENT AND FIRST FLOOR PLANS
ELKS' CLUB BUILDING, BERKELEY
W. H. RATCLIFF, JR., ARCHITECT



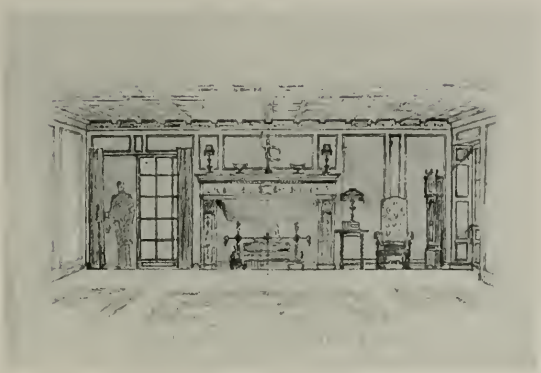
SECOND AND THIRD FLOOR PLANS
ELKS' CLUB BUILDING, BERKELEY
W. H. RATCLIFF, JR., ARCHITECT

FIRE HOUSE NO. 2, BERKELEY
W. H. RATCLIFF, JR., CITY ARCHITECT

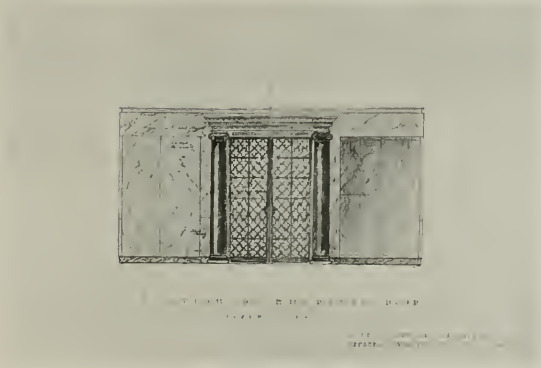
FIRE HOUSE NO. 8, BERKELEY
W. H. RATCLIFF, JR., CITY ARCHITECT



SOUTH ELEVATION OF DINING ROOM
COMMERCIAL CLUB, SAN FRANCISCO
W. H. RATCLIFF, JR., ARCHITECT



WEST END OF READING ROOM, COMMERCIAL CLUB
W. H. Ratcliff, Jr., Architect



INTERIOR DETAILS, COMMERCIAL CLUB, SAN FRANCISCO
W. H. Ratcliff, Jr., Architect

WEST END OF LOBBY, COMMERCIAL CLUB, SAN FRANCISCO

Prize Winners of the "Four Corners" Competition

By GEO. A. DAMON.*

AN EVENT of more than ordinary interest to all who are interested in city-planning, and especially in that phase of it having to do with the ideal development of residential districts, was the recent awarding of prizes in connection with the "Four Corners Competition," held under the auspices of Throop College of Technology, of Pasadena, California.

The competition, which was participated in by a number of architects, landscape architects and artists of ability both in Southern California and elsewhere, was the outgrowth of a study of actual conditions in Pasadena. Some time ago an unsightly shack was erected upon one of the prominent corners in a fine Crown City residence district and rented to a fruit vendor. A little later another owner built a hardly more prepossessing store for a groceryman on an opposite corner. The residents of the district took alarm and began an agitation to save the other two corners. Out of that agitation grew the Throop competition.

The prizes were offered with the idea of securing in graphic understandable form inspirations for something better in neighborhood-center developments. The problem taken up was just such a problem as had been brought home to the Pasadena neighborhood mentioned and the competitors were asked to draw up plans for the ideal treatment of the "four corner" centers that inevitably spring up in every extensive residence area. It was hoped that in this way interest might be awakened in the question of the intelligent, effective and artistic arrangement of these, the smallest units in the great city plan.

The competitors were asked to assume that the value per acre of the land on each corner of their community centers on paper was $12,500, and

* Dean of Engineering, Throop College of Technology, Pasadena, California.

to consider the limit of expenditure allowed for improvements at from $35,000 to $55,000 per corner. Otherwise they were given full latitude to their inventiveness and originality of taste.

The committee of award, comprising Architects John C. Austin, Elmer Grey and Albert R. Walker of Los Angeles, gave the first prize of $200 to Paul R. Williams, No. 1530 Twenty-first Street, Los Angeles. The second prize of $100 went to the Cook-Rankin-Wyckoff Company, landscape architects, 915 Marsh-Strong building. Porter W. Dorr and Alex J. Scholtes of Boston were given the third prize of $50. The judges, in announcing their award, stated that the margin of choice between the first two sketches was slight.

The design winning the first prize, and reproduced herein, shows one corner devoted to a trading center, but with stores set back from the street and entrances grouped in an open arcade, making it possible to secure display space without using the sidewalks, or unnecessarily calling attention to the commercial character of the building. Delivery wagons are relegated to the rear through two driveways, and provision is made for an automobile garage and market stalls on the back of the lot.

On the corner directly opposite, an apartment is shown of the same general type of architecture. The pleasing feature of this part of the design is the "homelike" appearance of the building, with its front lawn and ample space for playgrounds and flower garden in the rear. The "neighborhood church" and "community house" upon a third corner suggests possibilities of co-operation in religion and recreation, which might well be considered in every neighborhood, particularly in the outlying districts.

Upon the fourth corner, the design shows a combination of a small park and an automobile fire-engine house. Such an arrangement, it is explained, would allow the firemen to spend their surplus time, pleasantly and profitably in maintaining the flowers and lawn in the park.

The second prize design shows the "four corners" provided with a neighborhood park, a community building for lodges, library and moving pictures, an apartment house, and a group of stores about a municipal market. The features of this design are plenty of "open-air" space around all of the buildings, the convenience of the apartment arrangements, and the possibility of building stores on the "unit" principle, so that the trading center can be developed as the surrounding district builds up.

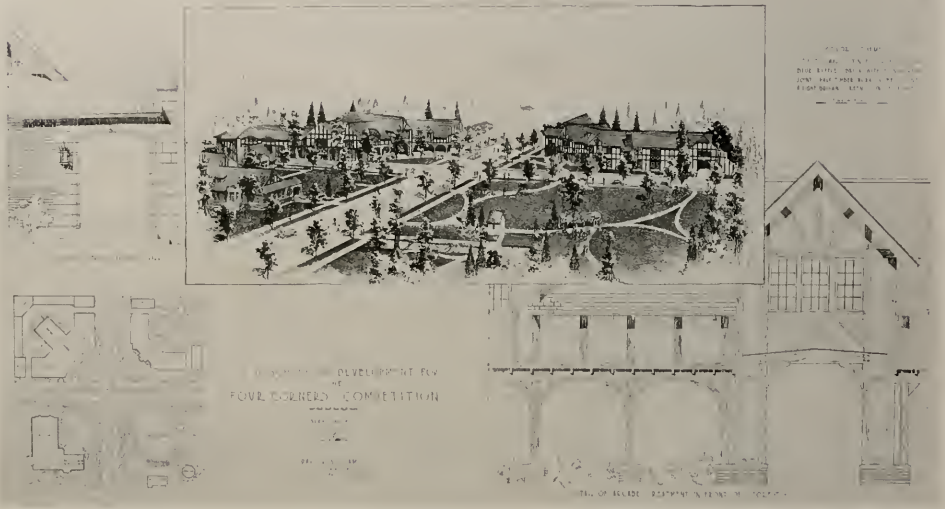
*
* *

Modern Requirements

THE Real Estate Man was showing apartments to the Young Married Couple. "There are," he said, "seven rooms and two baths; large, spacious kitchen; hot and cold water; southern exposure; elevator service; steam heat; gas; electricity and no charge for janitor's jobs. The price is especially low—only fifteen hundred a year. We will do all the papering necessary, repair floors and ceilings and make any alterations you desire."

The Young Bride turned to the Young Husband.

"James," she said coldly, "it won't do at all. The place is simply barbarous. I've studied the plans very carefully—and I don't see one single room where we could take up the rugs and dance!"—N. Y. Evening Sun.



AWARDED FIRST PRIZE IN "FOUR CORNERS COMPETITION."
THROOP COLLEGE OF TECHNOLOGY
SUBMITTED BY PAUL R. WILLIAMS

AWARDED SECOND PRIZE IN "FOUR CORNERS COMPETITION," THROOP COLLEGE OF TECHNOLOGY, PASADENA, CALIFORNIA SUBMITTED BY MESSRS. COOK, RANKIN & WYCKOFF

PHOEBE A. HEARST PLAN, UNIVERSITY OF CALIFORNIA
John Galen Howard, Architect
Showing Sather Campanile, North Hall and University Library

For a Greater University of California

THE Alumni Association of the University of California, by initiative petition, has placed on the November ballot a bond issue of $1,800,000 to be used for the erection of permanent buildings for the University of California.

For years the University has been steadily growing in attendance more rapidly than it has been possible to provide adequate permanent accommodations, and this year the overcrowding of the buildings makes it imperative that something be done at once to alleviate the conditions.

The University has this year over 5,200 students at Berkeley and a total registration of almost 8,000. This registration is growing at about the rate of 14 per cent each year. The present classroom accommodations are so meager that classes are being held in Harmon Gymnasium, in laboratories, offices and even out of doors in the Greek Theater.

There are only five permanent fireproof buildings on the campus, and but two of these have been built by the State, the others having been erected from private donations. These fire buildings are of the highest type of modern construction in plan, but the fire menace from the old buildings and the wooden "shack" buildings increases each year. The damage, the certain loss of an immense quantity of valuable records and the possible loss of life from a fire in any one of the frame buildings is an appalling thing to consider and would be a lasting disgrace to the State of California if it should occur.

If the bond issue is authorized by the voters of the State, it is proposed to increase the accommodations of the Department of Agriculture, build part of the permanent Chemistry Building, complete the University Library and replace the present North Hall, which has been in a dangerous condition for years.

The University Alumni is convinced of the justice and reasonableness of its request and believes that the bonds will pass if the voters realize the needs of the University and know that in the last ten years the State has given only half a million dollars for permanent buildings and that the only way of securing buildings now is by this bond issue.

Too Much Classic

Some Sharp Criticism of an Overworked Style of Architecture

By F. W. FITZPATRICK

IS IT that there's something radically wrong with me internally, that I have not the right artistic appreciation, or lack the proper cultivation, or why is it that I've gotten to the point that it makes me sick to see a "Classic" building? And pretty nearly every new one that goes up is a "classic" effort, so my illness is virtually a chronic one.

We Americans are apt to run good things into the ground. There's a certain paucity of Architectural and other expressions with us; we dearly love to follow a leader and we do it so thoroughly that we soon wear a rut, deep and wide, that everyone just naturally falls into.

The Chicago Exposition was a bold departure from the depressing and generally hideous architecture of that period; it was a beautiful Renaissance of the Classic in Art, it was a dream and naturally it had a wonderful influence throughout the whole country. We vied with one another as to who could reproduce the purest forms of Greek antiquity and we applied them, rather inappropriately I admit, to everything we had to build. It was all very fine at first, a relief from the crude attempts so many had made at following Richardson, attempts that produced mostly devilishly abortive freaks, *original* (!) conceptions in "free" and other Romanesques that made our buildings the jest of all Europe as well as mighty uncomfortable and unsightly things to live in.

But enough is as good as a feast. We've gone crazy on Classic, worked it to a frazzle. We build Greek Capitols, Roman Court Houses, Renaissance office buildings and then repeat the whole gamut in our stores, our houses, factories, stables and dog-kennels. It's a surfeit of Classicism, Greek Art ad nauseam, a "school" influence gone mad. Small wonder that it has made me sick and drives me almost crazy. I fight it, but the opposition is more than I can overcome. I have to "design (?) a great many buildings in a year, particularly big monumental chaps, and the demand is invariably "Make it Classic, Fitz, plenty of columns and imposing pediments, and don't forget the *quadriga*!" One can talk himself blue in the face trying to shift this insistence, but it's columns and entablatures or give up the job.

Look at our Capitols, for instance. Take the last half dozen built and don't they show a most startingly wonderful similarity in treatment? Can you tell one from the other? What the dickens is the use of specially designing each. Why not keep a lot of columns and quadrigas and things in stock and when a State decides upon a new Capitol just slap the stock affairs together and there you are? The results would be almost exactly as satisfactory, I am sure, and perchance the cost could be kept to the million and a half Capitols always start on, though they invariably end at from five to seventeen millions.

Seriously, isn't the whole scheme of "Designing" more or less farcical, but a thin excuse for adding unnecessary cost to buildings and a tickling of themselves by the architects? Here a while ago there was a very sane suggestion made that the Government could greatly expedite its buildings and lessen their cost by duplicating them. That is, here's one building in such or such a small city, perfectly satisfactory and attractive; why not change the color of the brick, if desired, but duplicate the building exactly in some other city requiring a Post Office, not in the vicinity of the first, but where the conditions, the lot, the climate, etc., are similar, instead of waiting a year for plans and special details of every feature that, when assembled, will look a good deal like the first anyway, or differ only in such non-essentials as would never be noticed by a layman?

The howl of opposition that went up from the horrified architects made Congress turn pale and very successfully side-tracked that suggestion. It were sacrilege, blasphemy, lèse-majesté and a lot of other unpardonable sins to do anything so sensible, the sacred usual and customary must be observed. Handsome stock doors are made but no architect will use them, every door must be specially designed, detailed and made though the result may be less satisfactory than the stock affair. It would cost a good deal less to make a dozen windows alike than all different, but no, every blessed one must be specially detailed and made, there may be but a variation of half an inch in the size of the glass or the shape of but one molding changed, but there has to be a difference, however little it can ever be noticed and however much it may cost. One of the silly and expensive sins of our profession, a lack of breadth of appreciation, of efficiency, of real economy.

Chicago first and California next started the insurgency against and threw off the thrall of the beautiful but overdone Classicism of our time. And California is to be congratulated upon thus showing more real sense of propriety, more snap and go, more true progressiveness than the East from which all Art blessings are supposed to flow. Perhaps the Mission influence of the earlier buildings had something to do with this insurgency, but I think the climate, a more beneficent out-of-doors, contributed more than anything else to the most wise and timely departure from the rut. After all, nature is the thing. Here's a thought suggested by Mr. Varon (and of New York at that) in a letter to me of recent date:

> Is the source of Art a geographical situation or does it lie within principle? I am inclined to believe that if the Orientals are a source of inspiration it may be because they live nearer to Nature. To apply to our ways of living and to our climate the Oriental forms might for some time be an agreeable change. But don't you think that if we here lived closer to Nature, observing it more and more, becoming more familiar with our great natural scenery in the Far West, doing away with much of our artificiality, paying greater tribute to natural attractions, that this would help evolve other and more appropriate combinations in Art?

* * *

The small banks are using their surplus co'n these days building new homes for themselves, and talking or writing about banks makes me think of a couple of cases recently that further illustrate the folly of architectural competitions, their unfairness and the unbusinesslike lack of principle that permits or prompts architects to go into them.

Four months ago there was a competition for a bank. One of the competitors came to me and because of a rush of work in his office, or for whatever reason or excuse is immaterial, he gave me the data and told me to go ahead as if it were for myself. I did. It was, I claim, a reasonably fair design. For some reason or other all the designs were rejected and a new competition started.

My first architect, disgusted, stayed out of it. Another one came to me virtually in the same way and I made another design, as unlike the first as I could, but yet—it had to be classic of course—the same old columns, quadriga et al. That competition, too, was called off. Then, here, a few weeks ago they gave the job outright, without further competition, to one who had entered neither of them and in time he came to me and I designed his building. Not a bit better nor for that matter much different from Nos. 1 or 2. Indeed, none of the designs submitted varied to a marked degree, the location and wants called for the perfectly obvious solution we all arrived at. Any design of the bunch (the architects invited were *all* fairly clever fellows) was just about as good as any other. It, therefore, was a competition of persons, not design, the design part was a trimming, a farce.

The other case was as amusing and illustrative of the futility of competition. It, too, was a bank, a big competition. In the same way a competitor turned the whole thing over to me (this one frankly admitted the problem seemed a bit involved for him). In due time that competition was declared unsatisfactory, three of the fellows were given a few hundred dollars and that ended it. Later, a young architect, who had not competed, a relation of the President of the bank, came to me, quite innocent of any connection I had had with the matter, and producing a photo of *my* design, told me that was what the bank intended to build and had instructed him to carry out, but he wanted me to make such slight changes, while keeping the thing intact in the main, as would absolve him from the charge of copying it exactly!

If architects must "compete" why not line up and have their prospective clients pick them out according to the color of their eyes, their hair, their facial expression, the number and importance of their relatives, the church or club they attend, rather than go to all the trouble and expense of producing a lot of drawings that, after all, in even the best managed competitions, cut such blamed little figure? The everlasting Classic stuff makes me sick and so do competitions. Guess I'd better hie me to a hospital cot. But come now, you architects, away down deep—though you won't say it out loud—don't you feel just the same way about the same things? Of course you do and, paradoxical as it may seem, I contend it's the healthiest sign there is about us. There now!

* * *

An Attractive Country Home

ONE of the largest and best finished residences in Palo Alto is now being built for Mrs. Henry F. Allen on her property on the northwesterly corner of Kingsley and Cowper streets, after the design of Architect Smith O'Brien of San Francisco.

The residence is placed on a slightly raised terrace, and is set 84 feet back from Kingsley street, and 91½ feet from Cowper street, and surrounded as it is by fine old oak trees will have a very charming setting.

The design is in the interesting English half-timbered style and will harmonize perfectly with the surroundings. The residence will have a frontage of 91 feet and a depth of 50 feet.

The interior arrangement is exceptionally convenient and comfortable and the ground floor opens up in a most attractive manner; interesting features too are the large brick-paved porches on which the dining and living rooms open.

In the rear of the property is being built a pretty shingled garage which will contain space for two automobiles and two bedrooms and a bathroom.

The cost of the residence and garage will be approximately $25,000.

The Service Rendered by the Architect*

By HOWARD HAMMITT

There seems to be a vague idea in the minds of many people as to the real functions of the architect, and exactly what service he renders in return for his fee. What he does in connection with the designing of a building is generally understood. It is common knowledge that in his preparation for the profession he trains his artistic talent to a high appreciation of form and proportion, makes an exhaustive study of the architecture of the ages and masters the technique of mechanical drawing; that it is his duty to translate into the design of the building his best appreciation of the individuality of the owner and cause it to represent truly in form the purpose for which it is to be used. But few people without building experience realize the nature and extent of the work aside from the matter of design that the architect undertakes in connection with the administration and supervision of the building operation and how it is possible for him to effect an actual saving of his client's funds if his work in this department is successful.

IN HIS initial interviews with prospective clients the architect often encounters some exceedingly interesting situations and is obliged to correct many strange misconceptions in regard to his work and methods. For example, the proprietor of a public garage in a thriving New York suburb who is contemplating an addition to his building to double its capacity says: "The new building will be nothing more than four walls and a roof, and I would hardly need an architect for that." A young matron about to establish her homestead says: "I could have my house built from this plan I cut out of the magazine. It is almost exactly what I want and I would not bother with an architect; but I want some changes in the rooms and I do not quite like the exterior." A leading Fifth avenue tailor, who has decided to build a home in a suburb, says: "I know all about building. No contractor can get the better of me. All I want is a set of plans and specifications and I can take care of the rest. Now show me the best house I can build for $12,000." Cases like these come every day to the architect dealing with prospective builders, and their frequence would seem to justify a brief explanation of architectural service in accordance with customary practice.

In the ordinary job there are three distinct divisions of the architect's work. These are: (1) the design, (2) the working drawings, specifications and details, and (3) the administration and supervision of construction.

The design is embodied in what are usually termed "preliminary sketches," which show the general plan of the interior and the form of the exterior. These are drawn to scale, but are not made in sufficient detail and with the accuracy necessary in actual working drawings. In these sketches the architect works out in definite form his solution of the problem based on the suggestions and requirements of the client. They constitute the medium through which a definite understanding is obtained of the size, design and cost of the proposed building. Here his artistic talent is brought into play and his ability as a designer is determined.

Before attempting this work he studies all those characteristics of his client that he can discover having a bearing on the client's home life. In this he must consider the whole family as a unit rather than the individual, if the house is to be equally successful for all. In the preliminary interviews he is ever alert for indications of taste and preference for special features. He will go over carefully with the client plans of a number of houses he has built and discuss the relative cost and desirability of various building materials. He is glad to see photographs of other houses that

* Reprinted from "House and Garden" by special permission from the publishers.

strike the client's fancy, as these assist him in determining just what is desired. A study of the proposed site is also necessary in order to design the building to harmonize with its surroundings.

If the preliminary sketches as submitted are not entirely satisfactory they are changed or redrawn until they represent exactly what the client wants and are acceptable in every respect. When these sketches are approved the first step is completed.

The next step is to prepare the working drawings, or plans, and write the specifications. The plans show the form and size of every part of the building. They require very careful and accurate work and are usually made by draftsmen under the direct supervision of the architect. Every detail is worked out precisely to scale and leaves no feature to the discretion of a workman. All questions of engineering, such as bearing strength of beams and columns, the relation between roof pitch and the roofing, lighting and structural ventilation, must be considered and wisely cared for.

The specifications designate the exact kind and quality of every material to be used and cover all details relative to the method of construction and progress of the work. They constitute the most important part of the contract with the builder. The judgment and experience of the architect is tested to the fullest extent in writing the specifications. In this alone he can often save the client many times the amount of his fee. The most appropriate material must be selected in each case, not so good as to cause needless extravagance or so poor as to bring after regrets that too great economy was exercised. The specifications must be complete to the last detail and cover every feature of the work, for two important reasons. The first is that the builder is thus enabled to figure very precisely the actual cost of the work. Nothing is left to his judgment or imagination and he is not obliged to allow a margin for contingencies. He can, therefore, estimate closely and make the lowest possible bid for the work. The second reason is that complete specifications which anticipate and fully cover every feature of the construction work entirely eliminate all extra charges. This enables the owner to place a definite limit on the cost, plan up to this limit and be assured that the amount of the contractor's bid will cover his entire expenditure. To accomplish this requires most painstaking work on the part of the architect, but the result is sure to be of financial benefit to the client and save him much annoyance.

With the plans and specifications completed the architect takes up the third feature of his work, the administration and supervision of construction. He proceeds to obtain from builders bids for the work. He supplies blue prints of the plans and copies of the specifications for this purpose and his office is used as headquarters. His judgment and experience are again of value to the client in selecting the contractor to whom the work is to be entrusted. The integrity, financial responsibility, methods, promptness, efficiency and general reputation of the various bidders are known to the architect and his advice in this matter is sure to be of value. It is frequently wise to give the job on a higher bid than the lowest when the qualifications of the bidders are considered.

When the successful bidder is determined the architect acts as counsel for the owner and draws up all contracts between the owner and the builder. He is familiar with all points of law that apply to such contracts and no further legal advice is necessary for the owner to enjoy full protection of his interests.

Before excavation is begun it is customary for the architect to stake out the exact site of the building, taking advantage of the most favorable

situation, with full consideration of the natural grades, so that best landscape effect will be secured and the least possible amount of special grading will be necessary. In country and suburban residence work this is usually a problem of considerable importance and one in which the experience and technical knowledge of the architect should always be consulted.

During the progress of construction the architect or his expert superintendent visits the job from time to time to see that all materials used are of the quality specified and every part is properly constructed. As the contract with the builder provides that no part of the work will be paid for until the architect has certified that it is O. K., it will be seen that the architect's judgment is final and his authority absolute. Since his own reputation as well as the interests of the client is at stake he will not hesitate to reject any work that is not fully up to standard.

The advantage of this system for the protection of the client will be at once apparent. The builder must not only produce work that will satisfy his own judgment but every part must be finished up to a standard that will be satisfactory to the architect, who has full technical knowledge as to what it should be and also a double incentive to reject it if it is inferior in any respect.

To conclude, the following incident will afford a sidelight on the effect of experience on a home-builder who was fortunately able to test the truth of the bromidium "One must build a house or two before one knows just what one really wants."

This home-builder recently came to an architect and said, "I want you to build me a house. I like the lines of the one you built for Mr. Blank and he tells me that you know your business. Now I want you to know at the outset that I am going to be an ideal client. I built a house a few years ago and for me it was a very serious proposition. I lived very near the job and watched every nail and screw that were driven. I inspected every board that was used and saw to it that every stroke of work was properly done. To say that I was popular with the contractor and the workmen would hardly be stating the facts and I really do not know how I managed to remain friends with the architect. He did not consider that it was necessary for him to give the work his usual close supervision because I was 'on the job' so much myself and the results of his absence have been apparent many times since in important parts of the house that proved I did not know about it at all."

* * *

The Lowest Bidder and the Lowest Responsible Bidder

AN EDITORIAL published in Engineering and Contracting recently, called attention to the fact that the lowest bidder and the lowest responsible bidder on a piece of work are often different contractors. An illustration was given in which the mayor of a small town insisted that a certain contract be awarded to the lowest bidder, although the engineer in charge suggested that the bid be rejected because it was obviously and very much too low. The mayor carried his point, the low bidder was awarded the contract and, owing to the lack of the requisite experience and working capital, soon abandoned his contract. The bondsmen, relatives of the contractor, refused to take up the work and suit had to be brought to compel them to do so. This, of course, meant a long delay in completing the work and heavy court costs. After the contractor abandoned his contract it was learned that he was an undertaker who,

during a dull season in his business, decided to take up contracting as a side line. The editorial mentioned concluded that: "If some municipal officials would give less thought to the possible saving of a few dollars in the contract price and would devote more consideration to ascertaining if the bidder had sufficient capital, experience, ability and plant to carry out the work, there would be fewer 'undertakers' taking up contracting as a side line."

The foregoing rather extreme case serves well to illustrate one of the greatest faults in the application of the contract system of doing public work, namely, the awarding of contracts to lowest bidders who are not properly qualified to carry their contracts to successful completion. This evil is becoming better recognized and there is a growing tendency to award contracts to the lowest responsible bidder rather than to the lowest bidder. Theoretically this has always been the case, but actually the vast majority of contracts for the building of public works have been awarded to the bidders submitting the lowest bids regardless of their other qualifications. This practice has been by no means limited to small towns or even to municipal works; in fact the practice has been all too general.

The two quotations which follow indicate the growing disapproval among engineers of the practice here condemned. In discussing a paper on the state supervision of dams and reservoirs, presented before the New England Water Works Association, Mr. M. O. Leighton, chief hydrographer of the United States Geological Survey, in part said:

> Consider the contractor. It is undoubtedly true that many dam failures have been caused by poor work on his part. You know the predicament of a contractor who is losing money on his job, and how easy it is to consider the fact that he is losing money and therefore to allow a little indulgence here and there. To secure a good piece of work under such conditions, eternal vigilance is usually necessary, and few of us measure up to eternal vigilance. One of the best ways to obviate such a difficulty is to abolish that absurd and antiquated regulation which prevails, especially in public work, that the contract shall be awarded to the lowest bidder regardless of the cost and the difficulties and regardless of the real responsibility of the man. In 90 per cent of the cases, and probably more, the expense, trouble and delay caused by a defaulting contractor who is awarded a job at a too low price, more than exceeds the difference between the successful bid and the rational one.

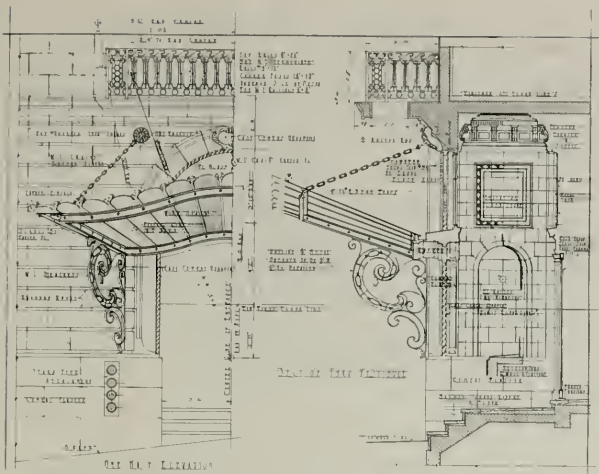
Plans and specifications insure good construction, as a rule, only under rigid inspection. Mr. Leighton's comments bring out a point which should be more generally appreciated by those who award contracts, that is, the human element must be considered in its relation to the rigidity of inspection when a contractor is losing considerable sums of money. The responsible contractor is one who will do good work even though at considerable financial loss to himself, but this type of contractor seldom bids too low in these days of basing bids upon carefully prepared contractor's cost estimates.

In his latest annual report, Mr. Charles A. Finley, superintendent of the Pittsburgh bureau of water, comments as follows upon the folly of awarding contracts to the lowest bidder, regardless of other considerations:

> The unfortunate and unwarranted delay in some of our new work calls attention to the necessity of more rigid determination of the ability of bidders to execute the terms of contracts. These delays have arisen from lack of management. The provision in our specifications, that the bidder shall have the necessary organization, capital, experience, etc., to execute the terms of the contract, should be made to mean just what it says. The fact that a bidder is the lowest bidder should not secure for him any consideration unless he had demonstrated the ability to execute such a contract.
>
> A competent contracting organization is just as essential to satisfactory results as is the engineering organization which designs and supervises the work.

Golden Gate cement used exclusively.

APARTMENT HOUSE FOR MESSRS. A. W. WILSON AND J. MARTIN SAN FRANCISCO, CALIFORNIA C. A. MEUSSDORFFER, ARCHITECT



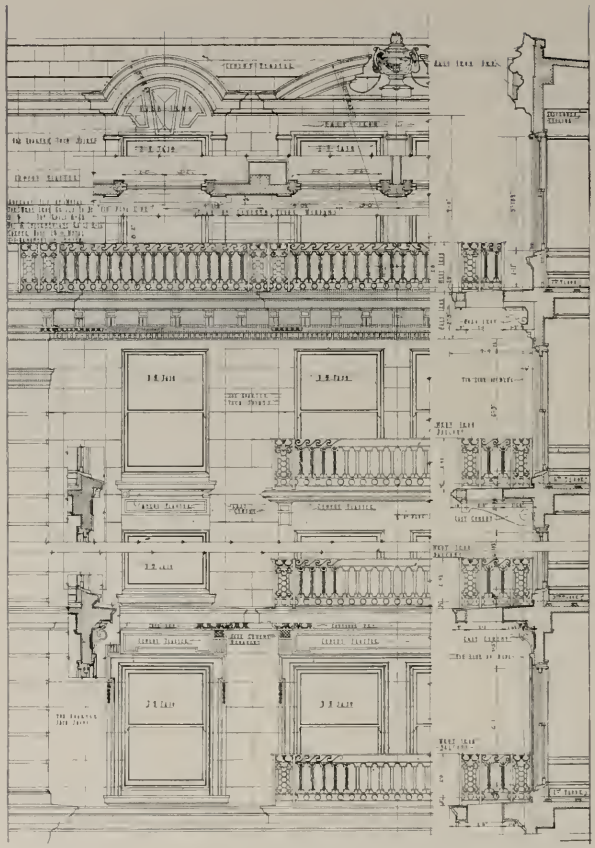
ELEVATION AND SECTION, APARTMENT HOUSE FOR MESSRS. WILSON AND MARTIN
C. A. Meussdorffer, Architect

Reinforced Concrete Apartment House

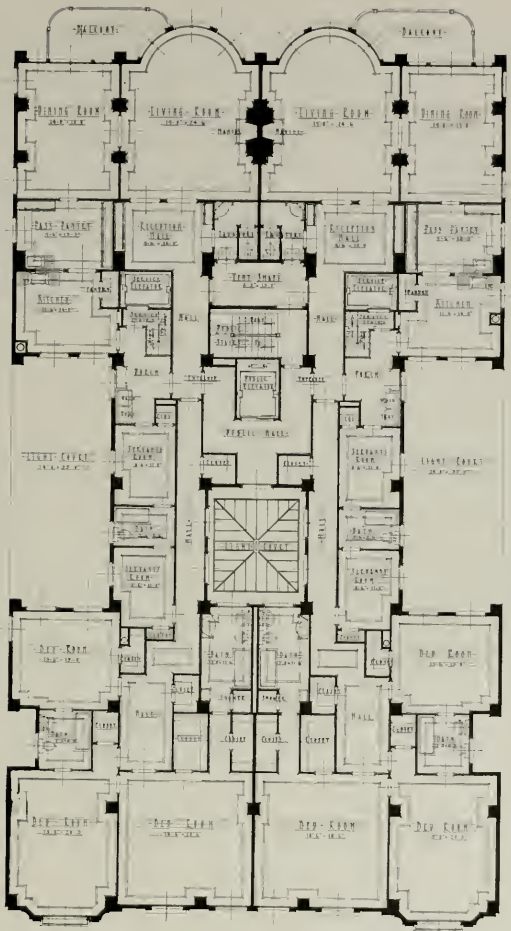
THE apartment house shown in the accompanying pages was designed by Architect C. A. Meussdorffer of San Francisco, who has endeavored to provide the comforts of home for the busy city man who hasn't the time or wherewithal to live in a house of his own in the country. The building occupies a marine view site on the East slope of Nob Hill, and is seven stories high, with a street frontage of 68 feet and a depth of 137½ feet. It is within a stone's throw of the Fairmont Hotel. Construction is of reinforced concrete and steel frame. The floors are wood. The style of architecture is French renaissance, with an exterior embellishment of white cement stucco, blocked off to imitate stone, and ornamental iron balconies at the windows and across the entire top floor, a feature familiar to all Parisian apartment dwellers. Over the main entrance will be an ornate hammered iron and copper marquise, giving approach to a Caen stone vestibule and lobby, the latter finished in mahogany, with art glass ceiling lights.

The design is somewhat away from the ordinary in that the main living rooms are in the rear of the building, instead of the front, this plan being followed so as to provide an unobstructed view of the Bay and surrounding country. Annexed to the dining room in each apartment, and separated by French doors, is an open-air dining porch or breakfast room.

There are fifteen apartments in the building, arranged as follows: Two apartments of five rooms and one of seven rooms on the first floor, and two apartments of eight rooms each on the six upper floors. Each



WORKING PLANS, APARTMENT HOUSE FOR MESSRS. WILSON AND MARTIN, SAN FRANCISCO
C. A. MEUSSDORFFER, ARCHITECT



TYPICAL FLOOR PLAN, APARTMENT HOUSE FOR MESSRS. WILSON AND MARTIN, SAN FRANCISCO
C. A. MEUSSDORFFER, ARCHITECT

apartment has from one to three private baths, finished in white enamel, with tile floors and wainscot and equipped with recessed tubs, automatic showers and pedestal lavatories.

Modern conveniences will include electric elevator service, vacuum cleaning, refrigerators, hardwood floors, dumb waiters, dressing tables, steam heat, fireplaces and private telephone service. The interior finish will be in keeping with the general architecture of the building, the French renaissance style being followed out in the decorations and furnishings. All woodwork will be either mahogany or white china gloss.

The kitchen will have patent coolers and a system of ventilation operated by an exhaust-fan, so that no odors can escape into the building. Space has been provided for thirty servants' rooms.

The main passenger elevator will be operated from the sub-basement to the roof. The former will contain a large garage, reached by means of a direct entrance from the street. There is also a ballroom in the basement.

The building is owned by A. W. Wilson and J. Martin and will cost, complete, $180,000.

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Building Concrete Houses without "Forms"

As showing the possibility of making concrete serve as its own form by erecting the work by stages the following description furnished by John J. Smith, architect and concrete engineer, Boston, Mass., may not be without interest:

The foundation wall was of reinforced concrete built without wood forms. Expanded metal rib studs were set up 14 in. apart and a still metal lath wired to both sides of studs (which are made 6 in. apart) gave a form for the wall and also provided reinforcement set up in place. The outside of these walls was given a heavy coat of cement mortar containing a little lime and hair. This when set made a rigid hollow wall which was then filled solid with concrete mixed in the usual way (but not too wet) in proportion 1:2:4. The walls, both inside and out, were floated to a sand finish with a wooden trowel. This made a very strong substantial wall built without wooden forms and only required a single bracing for the metal studs, using a piece of 2x4 as a straightedge and bracing either inside or outside, as most convenient, by driving stakes in the ground.

The walls of the house were made by setting up 2x4 studding similar to the balloon frame, but omitting the corner and other posts, also the girts and substituting in the place of these solid concrete posts and girts reinforced with two pieces of the metal rib studs, which for the girts were bent in the form of a truss. Metal strips were nailed to the studding on which were applied metal lath; this was then coated with cement mortar, using lime and hair sufficient to make it trowel readily. The metal lath was backed up on the inside with a cement mortar, so as to bury the metal at least 1 inch. The outside was then given a second coat of cement mortar made three of clean, sharp sand and one of cement. This is mixed with a waterproofing compound and stippled, while the wall is green, with a mixture of one of sand and one of cement well beaten to the consistency of a thick cream and applied with a kind of brush made by tying together a bunch of light twigs.

Practical Ideas for Practical Architects

Value of Maximum Results at a Minimum Cost as Compared With Architectural Creations.

By J. E. TOURTELOTTE *

COMMON SENSE is the current coin in life, and unless a work of art or architecture can stand the test of this touchstone it is questionable to my mind if it has a right to existence. In ancient times a thousand men would work for several generations to construct a building to honor the name of some individual or family, or to the honor of some nation or ruler's god. That was possible where one man had control over the lives of thousands of other men. It is not possible today under modern conditions, and looking at it from an economic standpoint few thoughtful men would consider it to be right to sink the production of a large per cent of a community's efforts for a hundred years, or any length of time, to the honor of anyone.

A person who is a member of any profession is very liable to get a narrow view and to think that the whole world should pivot on his particular line of work. Instead of practicing his profession that he may serve the community in which he lives for the benefit of the common good, he is very apt to talk in a bombastic way about educating the public up to his ideals, so as to get the public in an attitude of mind where they will serve him instead of being served by him.

I think it is as much of an honor for an architect to take a little money and by using ingenuity in devising and scheming out methods of getting maximum results at a minimum cost, and by the use of judgment to select inexpensive yet durable materials to enter into the construction of a building, as it is for another man to take a million dollars from a commonwealth and construct a creditable architectural monument, and is not capable of doing the former. The latter man in his high and mighty condescending way rather is inclined to look down upon his more humble brothers, considering them of mediocre ability compared to himself, in that they have never had an opportunity to show what they could do, and if our high and mighty friend has the misfortune to have a client call upon him who desires to get one hundred cents' value for every dollar he puts into a building he rather feels inclined to be insulted and talks to his fellow architect of the mean and penurious state of mind in which our modern business man grovels. I consider a man who can do the first kind of work deserving of much greater credit than the one who doesn't.

I have at times been afflicted with this disease myself, but have always striven to overcome it, as I consider it one of the most dangerous states of mind and attitude which the individual or the profession at large can get into, concerning the public, whom they are expected to serve in an architectural capacity.

There is an old saying which runs something like this, that the man who can make two blades of grass grow where only one blade grew before is of much greater value to a community than a whole race of politicians combined.

I would be one of the last to cry out in the interests of inferior work, but I do believe in the eternal fitness of things, and I am ever attempting to be broad-minded enough to see a building project, or any other kind of a project, from all points of view, and if my financial client sees nothing but the profit and loss side of the project, I am at least somewhat in

* Architect, Rothchild Building, Portland, Ore.

sympathy with him and can work sympathetically and harmoniously with him in developing his ideals and in guiding him in a manner so that I can inject some of my ideals into the architectural composition which we are attempting to create in brick and stone.

I think there is nothing which the public resents to so great an extent in the architectural profession as this attitude of an architect towards them. They go around to an architect and desire something which is reasonable in cost, and sometimes perhaps they are unreasonable, expecting a great deal more than they can get for a certain amount of money, but in a great many cases they are not at fault, and we, as their architectural advisers, after we have worked up their scheme, see where we could better it by adding this here and the other thing there and putting on touches over in the other place and have suggested these various things to them, until they have reached the point where they think themselves, it would spoil the building should they leave any of them off, and as a result at the day of the letting the building runs from 25 to 50 per cent in cost above the amount that they desired to expend, and as a result there is something doing. They claim that we told them that they could add these things at no extra cost, and we claim that when we suggested these things to them they agreed to them and desired them. By our suggestion we have awakened within them a desire for that which they are unable to pay for, and as a result, unless they can get that building which we have, unintentionally perhaps, worked them up to, they will never be satisfied.

As in most cases, the client when he confided in us gave us the limit of the amount which he would put into his building, the amount being in a great many cases the maximum amount of money which he could raise, or which he is satisfied at least to raise, and as a result he either gives up the project or cuts down the building to what it should have been in the first place, and is forever dissatisfied with the building and the architect who designed it. He goes out in the community in which he lives, telling his neighbors and friends to beware of the architect, as an individual and as a professional man, as he is a deceit and a snare. The architect has lost a great deal of good business and to a certain extent has lost the confidence of the public in him, more perhaps due to his lack of tact and judgment in seeing and appreciating the eternal fitness of things and governing himself accordingly than all other things combined.

In the interests of the great profession of which we are representatives, and in the interests of the common good—the great public whom we are here to serve—let us attempt to correct this thing by cutting down the building and getting the ideals of our client thinned down to about the size of his purse before we start in to make his drawings, or put his plans and specifications at least, out to bidders for their proposals.

I have known artists who, with a few cheap tools and with a dearth of materials, have produced a beautiful work of art, a work with more merit than that of other artists who were unlimited as to tools and materials. I have known of girls who were young, healthy and of an artistic temperament, take $7.50, and go to the country store and make a few purchases of inexpensive materials, and by the use of skill and gumption produce an outfit which, with themselves as a part of it, surpass in beauty other young ladies who expended $750.00 and had a fashionable dressmaker to assist them, and yet when done and they became a part of said outfit they did not rank ace high with the former ones. Of course, I do not expect you or I can equal the young ladies who were their own dressmakers, but at least we can best serve our clients by approximating them.

Illumination from Concealed Sources*

By RICHARD E. SMITH

SOME LIGHTING THOUGHTS SUMMARIZED

In stores, lighting has been abused because merchants have sought an advertising value in glaring lights.

Brilliant lights take the customer's attention from the merchandise that is offered for sale.

In drafting rooms indirect lighting is ideal, and here we meet the same conditions occurring in the general office.

Indirect lighting meets every need in an auditorium. Everyone has had the experience of sitting in a gallery and trying to see a speaker through a glittering chandelier. The indirect light will remedy this fault.

For residence lighting nothing is so effective as the indirect system. Once introduced into a home it never will be removed.

THE matter of lighting seems to have been shoved into the background by the architect, not intentionally, to be sure, but rather because, in his struggle to keep up with the progress in all the lines that affect his business, lighting has seemed to be of minor importance. But now the development of lighting appliances has reached the point where the architect must lend his assistance.

Lighting is of wonderful importance in any modern building. It determines between efficiency and waste, as in an office; safety and danger, as in a factory; eye-comfort and eye-strain, as in a school.

Indirect lighting is essentially scientific. It requires careful planning and the results can be pre-determined just as accurately as in any other branch of engineering. While the theory of illumination is complex, the practical features have been reduced to simple tables and the calculation of lighting problems is now comparatively simple.

Good lighting involves the following conditions:—there must be sufficient light for the room in question—to use more is unnecessary and wasteful; the light must be uniform and have good color values; glare must be eliminated; the fixture must be of suitable design; and the cost for installation and up-keep must be reasonable. Indirect lighting, properly installed, meets all these conditions.

It is characteristic of indirect lighting that there are no sharp shadows. This is on account of the large area of the light source. Another characteristic is the entire absence of glare on account of the diffusion in the reflectors as well as from the surface of the ceiling. These two characteristics explain most of the advantages of indirect lighting. It is of prime importance that the proper reflector be used in each fixture or much of the advantage will be lost. The opinion that indirect lighting is not efficient is not well founded. In the case of direct lighting, shades are used to lessen the glare and these shades necessarily absorb much of the light.

* Synopsis of an address delivered to the San Francisco Chapter of the American Institute of Architects, and revised for the readers of this magazine.

whereas, in the case of indirect lighting, powerful reflectors direct all the rays to the ceiling from which they are distributed as useful illumination.

Let us consider several typical installations. The first is a restaurant. The motif in a cafe should be *comfort*—soft decorations, good music, careful service, good food. Why is all this spoiled in so many instances by poor lighting? Principally because people do not think about illumination—it has to be brought to their attention. There is a certain charm about innumerable glittering lights out-of-doors. We all admire Coney Island and the Great White Way, but we do not want it in our homes or places of business, where we wish to center our attention on serious affairs.

In stores, lighting has been abused because merchants have sought an advertising value in glaring lights. The result is just the opposite from what they want. Brilliant lights take the customer's attention from the merchandise that is offered for sale. On the other hand there is something attractive about a good installation of indirect lighting that holds a customer in the store—he appreciates the light, just as he appreciates heat or ventilation, without realizing it. Another point of interest is the increased efficiency of the clerks due to the absence of glare and the consequent eye-strain.

The next installation to consider is a typical office. Such lighting must be perfect. Here again the efficiency of the worker should be considered for it is evident that one cannot do his best work unless he is comfortable. The absence of shadows increases the useful working space and the fact that local fixtures are not necessary allows the furniture to be re-arranged at will without altering the lighting appliances.

In drafting rooms indirect lighting is ideal and here we meet the same conditions occuring in the general office with the additional fact that this work is more confining and the need of perfect lighting is even greater than in the ordinary office.

Now we come to auditoriums. Everyone has had the experience of sitting in a gallery and trying to see the speaker through a glittering chandelier. Many a fine church has been spoiled by poor lighting and the effect of many a service is lost on those whose eyes are sensitive. Indirect lighting meets every need in an auditorium. Here the architect can help with his skill in design, and any scheme of architecture can be carried out in the fixture bowls. It matters not what the bowl may be, so long as correctly designed equipment is used inside the bowl.

In theaters indirect lighting has become almost universal. It gives that soft, comfortable illumination that all admire, it brings out architectural details, and it can be controlled for any intensity of light, giving a brilliant effect between the acts and a low, soft light during the performance. Indirect lighting increases the apparent ceiling height of a room, another fact that means much to the architect and which he can use to good advantage in lighting the lobbies and foyers of theaters.

The lighting of schools, particularly evening schools, has been notoriously bad. Gas arcs have been a sort of standard and they have made business for the oculist. The students at night school are entitled to every consideration. They come to study after a hard day's work under conditions far from ideal; they attempt to do in a few hours, work that is ordinarily allotted to an entire day. Good lighting, as well as heating, ventilation and comfortable furniture will go a long way towards making this work successful.

Residence lighting presents many problems to the architect because here the personal equation is encountered. It requires considerable per-

suasion to give people what they *need* instead of what they *want*. But if indirect lighting is once introduced into a home it will never be removed. It means *comfort* and comfort is inseparable from HOME. We recommend indirect lighting for every room in the house. If some direct lighting is used it is only a question of time until it will be displaced by the indirect method.

For residence lighting, nothing is so effective as the indirect system adapted to a portable. This does away with ceiling fixtures which are objectionable in some cases and as the portable lends itself to any scheme of decoration many pleasing effects can be obtained.

Fixtures are not essential to an indirect lighting system. Cornices can be used to conceal reflectors, as well as pedestals, urns, wall pockets, etc. Such special work of course requires special treatment but accurate data is now available whereby the architect can handle all ordinary problems.

Bare lamps hung in glass bowls do not make indirect lighting. While they reduce the glare in a measure, the bowl is still the lightest thing in the room and if a large lamp is used, there is still the brilliant light source that we seek to avoid. Still we meet conditions where an illuminated bowl is desired. Many people like to see the light source, just as they want an open fireplace, while the real heat in the room comes from a radiator. This condition can be fulfilled by using the regular indirect equipment with a small supplementary lamp which serves merely to light the bowl. The latter may be made of glass, silk, or any materials commonly used in the manufacture of fixtures. In no case should the bowl be more brilliant than the ceiling. By such an arrangement we get the artistic effect of the bowl without losing the effectiveness of the indirect lighting.

There are numerous cases where indirect lighting is not practical. These occur principally in factories, although there are instances where indirect lighting is not feasible in a finished building, as in a Gothic church where the ceiling is finished in dark woods. For such purposes there has been designed a series of reflectors which so thoroughly enclose the lamps and give such excellent diffusion that a brilliant illumination can be secured without the usual annoying glare. A photograph of such an installation shows no halation about the fixtures.

Safety and efficiency are the principal points to be considered in designing the lighting equipment for industrial plants. With the advent of Employers' Liability laws which force the employer to take a financial responsibility when his men are injured, a great deal of attention is now being turned to the question of safety. Naturally, good lighting means greater safety and it is now receiving the attention that it deserves.

A very interesting field of illumination from concealed sources is that of show window lighting. Engineers and laymen agree that the lamps in a show window should be concealed and the light concentrated on the display, giving the same effect that comes from the foot-lights on a stage. "Light on the object and not in the eye" is the rule.

Windows may be divided into half a dozen classes as to size and shape and each of these requires a reflector which gives a uniform light on the display as it will be arranged in that particular window. Some manufacturers make a single reflector and try to use it in every style window with the result that only an occasional window is satisfactory. Here, as in other branches of illumination, accurate data is at hand whereby the architect can easily select a reflector for his particular need.

Reflectors which are designed primarily for show windows can be used to good advantage in special schemes, such as the lighting of bulletin boards, rug display racks, bowling alleys, etc. It is simply a matter of selecting the right appliance for the case at hand.

To sum up: Good lighting is simply a matter of carefully considering the desired results in a specific case, and then selecting the appliance that most nearly fulfills these requirements. These requirements generally include practical, esthetic, and hygienic considerations, and should be settled by the architect rather than the client.

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Proportioning Aggregates for Portland Cement Concrete

Albert Moyer recently read an interesting paper before the American Society for Testing Materials on "Proportioning Aggregates for Portland Cement Concrete." The object of the investigations into the proper proportioning of aggregates for Portland-cement concrete is to obtain maximum density which, other things being equal, the author considers gives maximum strength.

One of the principal results obtained in these investigations was that arbitrary specifications without previous knowledge of the character of the aggregates that are to be used are wrong, and that such stated proportions as 1 : 2 : 4 or 1 : 3 : 6, etc., are meaningless.

It was found that 94 lb. per cu. ft., or 3.8 cu. ft. per barrel, as a unit of measurement is incorrect. Investigations prove that it takes 110 lb. of Portland cement to make 1 cu. ft. of paste. The author finds that, opposed to the old plan of filling the voids in sand with cement, these voids must necessarily be filled with paste (cement and water), and that the study of the proportioning of aggregates must be based on the proper proportions of cement, water and sand to make a sufficiently rich mortar to bind together the larger aggregates. The cement must be measured by weight, using 110 lb. as equivalent to 1 cu. ft. of paste. If a 94-lb. bag is used as a unit for measurement, the proportions must be figured so that the same proportion of cement to sand is obtained as when based on 110 lb. of cement per cubic foot of paste.

For the purpose of economy, various sizes of stone should be used and investigation made to see which sizes will produce the least percentage of voids, so that less mortar may be used and more strength obtained, for the reason that mortar is not as strong under compression as mortar and crushed stone or pebbles mixed together in the form of what we term concrete.

The paper gives various methods of carrying on investigations, so that with a given sand and a given stone or gravel, proportions can be stated by the engineer which will make a concrete of maximum density and maximum strength.

Building Trade Situation and Outlook

Table showing conditions of Building Trades and future probabilities, based upon statements made by members of the National Association of Manufacturers. These reports are on file at the offices of the Association.

INDUSTRY	PERCENTAGE OF REPLIES SHOWING															
	Improvement in Sales, Jan. 1 to June 30, 1914, compared with Jan. 1 to June 30, 1913				Improvement in Collections, Jan. 1 to June 30, 1914, compared with Jan. 1 to June 30, 1913				Present Condition of Industry				Prospects of Industry for the Current Year			
	None	Slight	Fair	Marked	None	Slight	Fair	Marked	Poor	Fair	Good	Excellent	Poor	Fair	Good	Excellent
	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Lumber and Manufactures																
(a) Boxes, Barrels, etc.	76	12	12	0	69	10	21	0	43	37	16	4	36	48	16	0
(b) Lumber for Building	63	20	10	7	67	16	14	3	36	41	18	5	32	42	20	6
(c) Miscellaneous Uses	62	15	12	11	70	13	13	4	32	45	16	7	32	42	20	6
Machinery																
(a) Boilers and Engines	69	13	9	9	68	17	11	4	38	33	20	9	37	38	16	9
(b) Electrical	70	6	3	21	61	13	20	6	39	30	17	14	35	38	12	15
(c) Iron Working	80	11	5	4	87	6	6	1	54	36	7	3	55	32	9	4
(d) Milling	74	18	0	8	82	5	10	3	38	47	10	5	46	40	11	3
(e) Mining, Excavating, etc	79	13	8	0	61	13	26	0	54	33	13	0	52	35	9	4
(f) Textile	84	4	8	4	74	17	3	6	47	36	14	3	48	35	14	3
(g) Woodworking	92	0	8	0	80	0	20	0	47	37	16	0	47	47	6	0
Tools and Hardware																
(a) Bolts, Nuts, etc.	66	6	17	11	53	12	29	6	33	40	16	11	37	38	0	25
(b) Builders' Hardware	72	7	7	14	58	21	21	0	38	38	12	12	20	60	7	13
(c) Mechanics' Tools	90	0	3	7	79	13	3	5	48	46	3	3	38	49	10	3
(d) Miscellaneous Hardware	72	7	10	11	80	8	11	1	36	46	12	6	28	49	16	7
Cement and Clay Products																
(a) Builders' Material	62	16	9	13	58	20	17	5	34	41	17	7	45	28	18	9
(b) Cement	80	13	7	0	90	5	5	0	41	59	0	0	47	37	16	0
(c) Crockery and Pottery	64	9	18	9	74	0	17	9	36	44	12	8	30	52	9	9
(d) Paving Material, etc.	50	12	25	13	30	30	10	0	13	25	50	12	14	14	29	43
Chemicals, Oils, Acids, etc.																
(a) Acids	53	7	27	13	56	19	19	6	29	35	24	12	31	44	19	6
(b) Paints, Varnishes and Dyes	58	20	13	8	57	14	27	2	27	46	20	7	25	48	20	7
Glass and Products																
(a) Bottles and Glassware	40	32	16	12	58	15	15	12	27	39	19	15	24	40	20	16
(b) Mirrors, Plate and Window	87	13	0	0	82	12	6	0	40	53	0	7	44	44	12	0
Iron and Steel																
(a) Bridge Construction	56	28	11	5	65	12	23	0	27	55	18	0	48	40	12	0
(b) Building Construction	65	19	7	9	78	8	12	2	46	42	8	4	46	33	16	5
Lighting and Heating																
(a) Illuminating	56	11	28	5	70	18	12	0	28	50	22	0	28	48	19	5
(b) Heating	74	14	8	4	67	14	14	5	38	36	18	8	19	51	26	4

Examination of Concrete Failures for Their Determining Causes

THE cement and concrete session of the 17th annual meeting of the American Society for Testing Materials at Atlantic City, was one of the most interesting of the meetings. Instead of the time being taken up largely with committee reports, it was devoted to the reading of papers. All previous records were broken in attendance, there being a total of 490. This society is widely recognized in the United States as the final authority for the preparation of standard specifications for the various materials of construction.

R. S. Greenman, in a paper on "The Examination of Concrete Failures for Their Determining Causes," states that concrete is said to be its own best inspector, and it is a well known fact that defects in concrete will sooner or later make their presence known.

The reasons for poor concrete have been proportioned as being 90% due to poor workmanship, 8% due to poor aggregates, and 2% due to poor cement. These reasons and the additional one of the influence of the water used, are responsible for most of the failures in concrete. These failures are more frequent in smaller than in larger work and the resulting losses are proportionately greater.

To find a reason one must examine all possible causes and must follow up all clues that tend toward disclosing the reason. The design, the quality and proportions of the materials used, the mixing and placing and the care of the finished concrete must all be considered In making an examination, each case must be treated entirely upon its own individuality; and the right clue will not be found unless the investigator knows good and poor concrete and knows why certain things produce certain results in concrete.

In trying to solve a problem of poor concrete the elements to be investigated are cement, aggregates, workmanship—and water. The common tendency is first to place the blame upon the cement, but if it is found that, in accordance with good and generally common practice, the cement has been tested and has met the standard requirements, the cement then becomes a negligible factor; but if it has not been tested, it must be considered as a possible cause, and it may become a large item in the study. It must be admitted that since so much stress has been laid upon the value of having cement tested before use, and since it must indeed be a small work on which it has not been so tested, the percentage of failures, due to poor cement has been reduced to a very small amount.

The strong and the weak points in both the course and fine aggregates have been too often neglected. The course aggregates can usually be judged by easy inspections, but sand or other fine aggregates need very careful examination. The characteristics—such as the grain, the grading, the cleanness and freedom from organic impurities and excess of loam are items of knowledge which are obtainable mainly in the laboratory, but which are very essential for the correct diagnosis of a concrete failure.

The effect of workmanship is by far the largest factor and in it all others are included, for a poor workman can destroy the value of the best materials. Under the head of workmanship must be considered such items as design, proportions, placing, and actions resulting from heat, frost, electrolysis, etc., which should have been taken care of in the process of making, hardening and preservation.

As another element of importance, it must always be kept in mind that the water which is used in making the concrete, or which may come in contact with it, may prove to be a very influential factor for harmful results.

To illustrate the possibilities of various influences, specific cases are cited showing effects of certain elements upon water, sand and stone and the resulting effects upon the concrete. The effects of poor workmanship are seen in various conditions found in concrete. To find these effects it is also necessary that the investigator shall know how to grasp and to follow up the first indications of there having been anything wrong.

Some external influences also cause concrete to fail and the possible relation of these to concrete failures must be considered. For many years all the failures of concrete were considered as being due to the formation of certain chemical relations; but as it is commonly acknowledged at present that an impermeable concrete will stand in sea water as well as elsewhere, although subjected frequently to more severe actions than other concrete, its failures are due frequently to the same causes as those of other concretes and therefore the same examinations should give the same results. Similarly, since electrolysis is considered as a cause for the breaking down of concrete, the liability of concrete being affected by its influence will depend upon whether or not the concrete comes under the influence of an electric current. If it does, then its influence needs to be examined. If it does not, then the examination should also follow the usual method.

The value of laboratory tests and analyses should not be overlooked. While perhaps not giving such definite information as a field inspection, they should be used to the fullest extent to help establish the strength or weakness of a reasonable theory for the cause of failure. Where time will permit, laboratory tests of concrete made of the aggregates under as nearly as possible the same conditions, will give results that should aid in determining the fault in the original. Test specimens so made and treated should give practically the same results, and when compared with test specimens made under ideal conditions or with standard materials, should give the investigator the reasons for the failure.

All means possible should be used by an investigator in making his examination, and his conclusions must be drawn only after he has considered the failure from every probable cause, with reason and fairness. The object of the examination is either to place responsibility or to guard against future failures, and right conclusions are the only ones that should be drawn if justice to either objective is to be given.

* * *

Paint on Cement or Concrete Surfaces

A PAPER on "Paint Protection for Portland Cement Surfaces," by H. A. Gardner of Washington, D. C., was read recently before the American Society for Testing Materials.

In April, 1912, Mr. Gardner instituted in Washington a series of tests to determine the durability of various types of paint upon Portland cement surfaces exposed to the weather. The panels for the tests were prepared by constructing a long board wall to which was fastened expanded metal. A mixture of 1 part of Portland cement and 2 parts of clean Potomac River sand was made and applied to the expanded metal, forming a cement wall 3 inches in depth. The wall was divided into 35 sections or panels, each 30 inches wide and 40 inches high. Three coats of paint were applied to each panel by a practical journeyman painter. In order to make the

test more severe, nearly all of the paints were applied in white. (Tinted paints are known to be much more durable than white paints.) A strip of chrome green, 6 inches wide, was placed over the top of the third coat of paint, in order to determine whether or not the lime which might be present on the surface of the cement would have any effect upon the paint coating. Fading of the green to a yellow would indicate such action. A priming coat of 25% zinc sulphate solution was applied to the panels, to neutralize any free lime, but this is held to be unnecessary if the surface is dry when painted and will not be exposed to the weather.

The general results of the tests at the end of a 2-year period, together with an outline of the composition of the paints tested, is given as follows:

Class No. 1—Single-pigment paints, made with white lead or zinc oxide ground in pure linseed oil. (These paints are in very good condition throughout.)

Class No. 2—Combination-pigment paints made of mixtures of white lead, zinc oxide or similar pigments ground in pure linseed oil. (These paints are in generally excellent condition.)

Class No. 3—Combination-pigment paints ground with mixtures of raw and heavy-bodied linseed oil or with treated Chinese wood oil. The viscosity of these oils requires the use of considerable turpentine or other thinner in the manufacture of such paints, in order to make them of the right viscosity for application. Semi-flat surfaces are therefore produced during the drying. (Most of these paints are in excellent condition.)

Class No. 4—Single- and combination-pigments ground in oil varnishes containing acid resins. (These paints are checking and scaling in many spots. Such varnish paints are apparently not suited to exterior exposure.)

Class No. 5—Paints containing resins dissolved in volatile spirits (spirit varnishes) with or without pigments. (These paints are not giving very satisfactory service, the clear varnishes having entirely decayed in some cases. Those to which pigment has been added are in somewhat better condition.)

Class No. 6—Paints made with single- and combination-pigments ground in a water medium containing glue or casein as a binder. (These paints are chalking rapidly and are not moisture-proofing the cement. The pigment binder has been destroyed by the weather.)

The tests showed that the amount of free lime in fairly dry cement surfaces does not adversely affect high-grade oil paints. The tests also showed that zinc sulphate may be used with excellent results as a primer to neutralize free lime in damp cement surfaces which are to be painted.

Opaque white pigments, such as basic-sulphate white lead, basic-carbonate white lead, zinc oxide, and lithopone, were present in the paints which gave the best results. In some of these paints there was present a percentage of inert pigments, such as barytes, asbestine, whiting, china clay, gypsum and silica. The scaling of varnish paints, which developed in several tests, apparently showed that resinous paints are not well suited for cement surfaces.

The oil paint is not attacked by the dry cement, and holds both texture and color. Equally satisfactory results were obtained with boiled linseed oil, mixtures of raw and boiled oil, and mixtures with Chinese wood oil. Such simple paint coatings were also found to be excellent for concrete floors, being durable, wear-resisting, and dust-preventive.

The results of these tests are quite in line with the results obtained by Ware and Schott in a series of paint exposure tests made upon exterior concrete surfaces. They also agree with previous long-time exposure tests made by the author.

* * *

Why We Do It

Advertise and the world buys of you:
Renig, and you need a loan.
If you never tell what you have to sell,
You'll have troubles all your own.
—Los Angeles Evening Herald.

The Fun of Building a House on Paper

A NEWSPAPER YARN BY L. CLARE DAVIS

Architects doubtless will take exception to some things which this writer has to say about the profession. For example—to infer that an architect lacks imagination is virtually to admit he has no originality, and the designer who cannot serve his client with something a little out of the ordinary these days—something original—had best retire from the game.

This article was written by a woman—it sounds like one, too—and we are printing it because it throws a ray of light upon the troubles of the architect whose lot it is to plan or assist in planning a home—usually with a woman's "assistance."

THE excavating has been done for my friend's new house and she says it is the most interesting hole-in-the-ground she ever saw.

This is the stage of the house-building game when you get a second crop of enthusiasm. The first lot has usually been exhausted on the plans. Such a lot of thought, energy, interest and enthusiasm as goes into plans! But what a lot of fun can be extracted from building houses on paper. In fact, that is where most of the fun comes in, for you can have most anything you want if the sheet of drawing paper is big enough, your imagination is in good trim and your pencil holds out.

It is only when the home-made plans are submitted to the cold, calculating eye of an architect or builder that the grim facts of life become apparent. You can't have six feet of windows in a space that is only four feet two inches wide, he says. On paper it looked as if you could. You can't have hardwood floors all over the house and have enough money left to build a nice big open fireplace. If you built the fireplace you couldn't buy coal enough to keep it warm. You can't have a nice convenient family stairway that parts its hair in the middle and from one convenient landing allows you to glide gracefully down into the reception hall if you are dressed for company, or to slip hastily up from the kitchen to take down your curl papers and dab on a little powder, when some one is waiting downstairs, without giving up half of the hall and half of the dining room to three or four dinky steps, or building an addition somewhere to let the steps back in out of the way.

Say what you like, an architect lacks imagination. He is always holding one down to inches and feet and such stuff as that. How can one be bothered to leave spaces in the right places for doors after using all one's gray matter trying to decide whether the hand rail of the stairs shall be mahogany finish or ebony?

Building a house is a matter of several intermittent attacks. It breaks out with a rosy rash of enthusiasm, that rises into a high fever over plans, runs its course for six weeks or so, then subsides, only to come on as a relapse after many days.

The first week of bending over plans and laying out attractive little nooks and recesses and window seats it seems as if you would simply have to begin building tomorrow afternoon at 3 o'clock. By the end of the fifth week there is a slump. Oh, shucks, building is too expensive! We don't want to build. Renting is cheaper. The plans are flung into a drawer. There is a decided nausea whenever sleeping porches, flues, plumbing, furnaces and so on are mentioned.

After a time the temperature rises again higher than ever. In the meantime every house within a radius of 750 miles has been glanced at or inspected for possible ideas or suggestions. Books with such attractive titles as, "Beautiful Homes for $5000," "Bungalows That Can Be Built

for $3,000," "Why Pay Rent When You Can Own Your Own Home." "Beautiful Interiors and Artistic Exteriors," form the most fascinating literature there is.

Other people with the same disease running its course are the most interesting folks in the world to talk with. You almost hug them because they have run up against some of the wild snags that you have met. You fairly love them and yearn over them as they tell how they scrapped over whether the dining room should have French doors and white woodwork or dark woodwork and just doors.

You hang on their utterances and break in with delighted exclamations of sympathetic misery as they tell how they had to give up nearly everything they had set their heads on in a house because it was going to cost too much. So they just moved and that was nearly as exciting and devilish and nerve-racking as building a house. Ah, well, it is far better to have planned and not builded than never to have planned at all. With a lot, a set of plans and a dollar to start with, there is always a chance for the disease to break out again and get you to the hole-in-the-ground stage.

* * *

The Tenth International Congress of Architects in 1915

DESPITE the unsettled conditions abroad, plans are being made for the Tenth International Congress of Architects, which will take place at St. Petersburg on the 18th to the 24th of May, 1915. The Congress will be held under the patronage of His Majesty, Emperor Nicholas II, with Her Highness the Grand Duchess Marie Pawlowna, President of the Imperial Academy of Beaux-Arts, as Honorary President.

The last Congress, held in Rome in 1911, decided that the Tenth Congress should take place in 1914, but, for various reasons, it was finally set for the date above given. All of the sections of the Permanent Committee of the International Congress are asked to at once undertake the organization of their respective sections. It is necessary to proceed with some celerity, by reason of the fact that in addition to the excursions and festivities which have been arranged, many serious sessions will be devoted to the discussion of the various topics assigned for that purpose, together with the reading of such reports as have been requested, or may later be offered.

In connection with the National Exposition of Russian Architecture, and the International Exhibition of Theater Architecture, which will be open at that time, there will be conferences devoted to the subject of Russian architecture, as well as to those plans, views and books related to the development of the architecture of the theater in all countries during the last fifty years, which exhibits will form a part of the last-named exposition. The different sections of the Permanent Committee have been asked to constitute themselves as juries of admission, to deal with such exhibits of theater architecture as may be offered for the exposition.

This international exhibition will be inaugurated on the 1st of May, 1915 (American calendar), and will be held in the rooms of the Imperial Academy of Beaux Arts. German confrères, having built many theaters during the last few years, will exhibit a number of plans, methodically classed, according to the purpose for which they were built—opera, comedy or drama.

In connection with the subject of theater architecture, it has been thought that the occasion would also be an auspicious one for devoting some attention to motion-picture theaters. There is no reason why architects should not evolve forms which are both artistic and perfectly adapted to

the production of motion-pictures, and it is certain that all offered solutions of this problem will be attentively studied.

As English has been admitted as one of the languages of the Congress, and as qualified interpreters and stenographers will be found at St. Petersburg, no English-speaking architect need fear any difficulty on that score, and the committee sincerely hopes that many members of the American Institute of Architects will come to St. Petersburg in 1915.

* * *

War and Architecture

IT IS not generally considered that war comes within the province of an architectural publication, and yet, why not? asks the Institute Journal. Save for the grim hand of ceaseless Time, what factor has contributed more to the destruction of much of the best that architecture has given toward the progress of mankind, than has war?

Architecture seeks to uplift and to ennoble. War seeks to destroy and to degrade. The two are mortal enemies.

For centuries architecture has sought to translate the aspirations of humanity into living records; to add the inspiration of beauty to the struggle of man to emerge from barbarism. At every turn in the road, war has risen to drench his path with blood and to barricade it with the sickening obstacles of needless human suffering and wanton waste. And now, when science has risen to her topmost heights—when the world's commerce and industry are so inextricably woven that all mankind must suffer—five great powers are again plunged into the vortex of murder and destruction!

How fortunate is the situation of the United States at the present moment! What an opportunity presents itself! Not merely to profit through broadening markets—not merely to gain money through supplying the demands of countries whose usual source of supply is suspended—not ignobly and greedily to absorb the profits of another's misfortune, but to prove to the world at large what irreparable disasters are today heaped upon a country, which seeks to settle by war those questions which never have been and never can be settled until blind passions are supplanted by reason.

In the meantime, let us hold ourselves above all prejudice and partisanship, pitying all, and reserving our judgment until it has been matured through a disclosure of all the mysterious forces which are not yet revealed to the common citizen. Let us look forward to the day when architecture may be called to the supreme task of raising the emblem of the world at peace.

In a circular issued by the R. I. B. A., announcing a recent meeting, the suggestion is made that the authorities be requested to avail of the services of architects with respect to military buildings erected during the war.

Commenting on this circular, The Builder states, in part, as follows:

> It is quite possible that if the authorities receive the aid of architects with respect to military buildings during the war they may come to the conclusion afterwards that there is some connection between efficiency and knowledge, and that, after all, buildings are more efficiently designed and constructed under architects than under the royal engineers. If so, we may reap in the future benefits from the services rendered in the present. The suggestion that architects should look after the work of those members of the profession who take their place on the firing line is also a good one, and will, we have no doubt, meet with an adequate response. But we believe the greatest good would come from carrying out the suggestion we have made that the local government board should be approached with the view of obtaining the acceleration of schemes already approved, and that they should give their sanction to new schemes of a utilitarian character with greater readiness than in more normal times.

Should Specifications Specify?*

By LEE ULLERY.

SPECIFICATIONS should be explicit, and state exactly what is to be done, so that bidders may know what to expect, and therefore they will have no grounds for complaint if required to perform the work accordingly.

If specifications are not definite, or not to be followed without deviation, no bidder can form an estimate as to what may be exacted, and it will be impossible to obtain bids from competent, reliable contractors. No desirable contractor will bid on work, the extent of which is unknown, and who must depend upon the notions and aesthetic fancy of the Superintendent who may happen to be in charge of the work.

Contractors are unwilling to perform more work than is specifically required, or to furnish better material than called for. We find many instances of the efforts of contractors and material men trying to misconstrue the specifications, letters of acceptance, or the letters of approval of samples, as well as the drawing requirements, so it is necessary to be specific. Illustrating the point, I may cite a recent experience. Relative to the approval of samples of flooring, where the specification required same to be one and one-fourth inch thick, a sample one and one-eighth inch thick was approved. The material men claimed the approval of the sample created a modification of the requirement, but I pointed out that the letter advising of the approval stated the approval was as to quality, and that the dimensions of the material furnished must comply with the specification.

We cannot justly censure contractors and material men for trying to evade items of expense that are not clearly called for, and where the requirements are that the work shall be executed in accordance with the drawings and specification, without deviation therefrom. We cannot extend any favors to a contractor. How can we expect any gratuities from him?

Contractors frequently tell us they cannot secure the kind of materials called for and offer to substitute something else, which may be fully as good, but we cannot permit the substitution under our instructions, and it is not surprising that contractors refuse to furnish what is not specifically called for, when we want a betterment.

I once called a draftsman's attention to the fact that his drawings did not indicate what framing should be placed beneath a stair platform in a building for which I was writing a specification, and I advised him to indicate on the drawing the framing that would be required, but he told me it was not necessary to go into detail to that extent. He said, "No contractor will construct the stairs without placing suitable framing." But we do not want to depend upon the contractor for substantial supports for stairs, or other construction. True, the shop drawings would have to be prepared by the contractor, and approved in the Supervising Architect's Office, but should not the contractor and material men know before making their bid what is required, approximately, at least, to meet the approval of the structural engineers?

I know a contractor who submitted a proposal for fireproofing the floors of a certain building after his original bid had been opened and found to be the lowest received. He stated that he considered the beams and girders already provided would not have to be made more than a small per

* Paper read before the Society of Constructors of Federal Buildings at Washington, D. C.

cent heavier, and that additional steel beams would be added to correspond with construction of other fireproof floors. He complained continually during the construction of the work that the increase had been unreasonable; that the beams and girders substituted for those originally shown were fully fifty per cent heavier, and that the new beams required were much heavier than beams he had placed in similar floors in other buildings. Such changes should not be made in that way, as expense is suffered that was not contemplated by the contractor.

Some years ago a contractor failed to include in his original bid certain items of work that were required. These items were clearly shown but overlooked by him in preparing his bid. Afterward a proposal for an additional item was accepted. The next day it was discovered that an error had been made in considering the bid and an effort was made to revoke the acceptance of the bid. The contractor stated that it was too late to revoke the acceptance, as he had ordered his material. "But," said the official, "your bid was a thousand dollars too high." "Well," said the contractor, "I am very sorry, but I am only sorry because it wasn't ten thousand dollars too high."

This shows how some of the contractors feel about these matters. They cannot receive any favors, but have to stand the loss due to their own errors. They are of course not willing to refund when mistakes are made by the other party to the contract. When the specification and drawings are clear and explicit as to the requirements, it is for the contractor to inform himself, before he submits his bid, of all the conditions. The opportunity should always be given him to so inform himself by specific drawings and specifications.

* * *

Touch of Genius

SANDY MACPHERSON started to build a small house of bricks. After the usual plan of bricklayers, he worked from the inside, and, as he had the material close beside him, the walls were rising fast when noon arrived, and with it his son Jock, who brought his father's dinner.

With honest pride in his eyes, Sandy looked at Jock over the wall on which he was engaged, and asked:

"Hoo d'ye think I'm gettin' on?"

"Famous, fether; but hoo dae ye get out? You've forgot the door."

One glance around showed Sandy that his son was right; but, looking kindly at him, he said:

"Man, Jock, you've got a gran' heid on ye! Ye'll be an architect yet, as sure's yer feyther's a builder."

* * *

How One Architectural Firm Meets the Slack Times

A WELL KNOWN San Francisco architect, whose office turns out something more than a million dollars' worth of work annually, called his staff together the other day and announced that on account of the hard times and unsatisfactory state of the money market, he would cut all salaries, from chief draftsman to office boy, 30 per cent.

"If there is anyone here who objects to this reduction," concluded the architect, "he can have a week's pay and go."

It is needless to say none of them went.

How much better some such plan as this than the ruling practice of dismissing a good man altogether.

The Skyscraper

By MADISON CAWEIN
In The Smart Set

ENORMOUSLY it lifts
Its tower against the splendor of the west;
Like some bright dream that drifts
Before the mind, and, at the will's behest—
Enchantment-based, gigantic steel and stone—
Is given permanence;
A concrete fact,
Complete, alone,
Glorious, immense,
Such as no nation here on earth has known:
Epitomizing all
That is American, that stands for youth
And strength and truth;
That's individual
And beautiful and free,
Resistless strength and tireless energy.
Even as a cataract,
Its superb fact
Suggests vast forces Nature builds with—Joy
And Power and Thought,
She to her aid has brought
For eons past, will bring for eons yet to be,
Shaping the world to her desire. The three
Her counselors constantly—
Her architects, through whom her dreams come true:
Her workmen, bringing forth,
With toil that shall not cease,
Mountains and plains and seas,
That make the earth
The glory that it is;
And, one with these,
Such works of man as this,
This building, towering into the blue,
The beacon, round which, like an ocean wide,
Circles and flows the restless human tide.

The Case of Herington vs. Murray

The following decision in the case of Herington vs. Murray by Judge Morrison of Los Angeles is of special interest to architects and builders, because it deals indirectly with the irresponsible contractor—the fellow who bids lower than he can afford to for the sake of landing a job, then undertakes to "skin" the work at the expense of the owner to save himself from bankruptcy.

AFTER several months' contention in court, the case of Contractor John Herington against John E. Murray, owner, arising out of a dispute over the erection of a brick apartment house at 1026 Orange street, Los Angeles, has been decided in favor of the contractor, who had sued for $25,860 claimed still due him upon the contract, and the further sum of $2,500 as damages for the alleged failure of the owner and his architect to furnish him proper detailed drawings. Judgment was given the contractor by Judge Morrison in the sum of $17,028.91, from which must be settled twenty-five lien claims amounting to $16,660.08.

This case has attracted wide interest among architects and contractors as well as owners and others interested in building, involving as it did many of the fundamental principles upon which are based the relations between contractor, architect and owner.

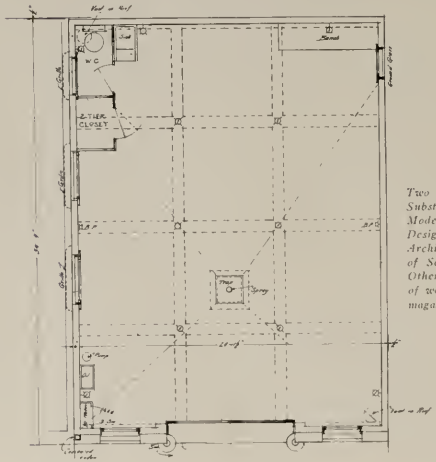
The original contract provided for the completion of the building in December, 1913, but an allowance was made of forty working days' extension of time owing to changes and extra orders. The differences between the contractor and owner, however, and the refusal of the contractor to turn the building over until he had been paid what he claimed was due him, held the building vacant and the owner's investment idle for some time, for which the court allowed the owner three months' rental claim from the contractor.

The original contract price was $46,282, which was increased $3,399.76 for extras furnished by the contractor on signed orders, and $18 for two extra trusses put in without a signed order, making the total due on the contract $49,699.76. Of this sum the owner had paid $26,745.42, leaving a balance due of $22,954.34.

The owner, however, claimed that the completed building was not according to specifications and refused to pay the full amount claimed by the contractor, in which he was sustained by the court, which allowed deductions for defective work and loss of time occasioned by repairing such defects after he obtained possession of the building, to the amount of $7,342.81. While the court stated that Contractor Herington's mistakes were in its opinion ones of judgment rather than arising from a desire to take advantage of the owner. The court severely scored some of the sub-contractors on the charge of "skinning the job," and held that the general contractor should have insisted that all of his sub-contractors comply strictly with their contracts.

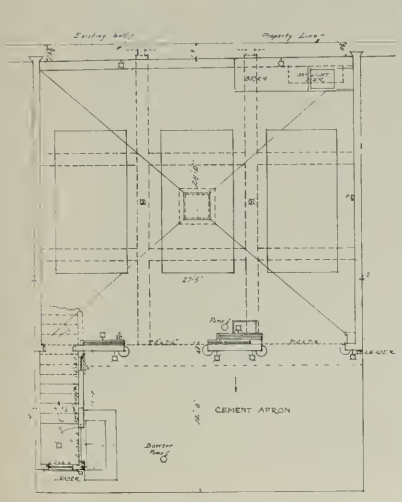
The court found that Contractor Herington had $15,611.53 due him on the contract price, plus $2,121 for interest on this sum up to the time the case was closed in court. It, however, allowed the owner $703.62 for interest on the sum involved by the deductions for defects and loss of rental, leaving $17,028.91 actually due the general contractor. It found that lien claimants had $15,144.49 due them (after deductions from their claims were determined) plus $1,486.94 for interest and $28.65 to cover the cost of filing papers in the suit.

GARAGE FOR WARREN D. CLARK, ESQ., SAN FRANCISCO

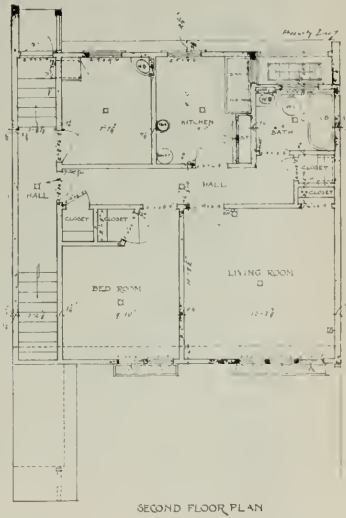


Two Private Garages Substantially Built at Moderate Cost. Designed by Architect Nathaniel Blaisdell of San Francisco. Other examples of this class of work will appear in this magazine from time to time.

GARAGE FOR DR. KASPAR PISCHEL, SAN FRANCISCO
Nathaniel Blaisdell, Architect



FIRST FLOOR PLAN



SECOND FLOOR PLAN

GARAGE FOR DR. KASPAR PISCHEL, SAN FRANCISCO
Nathaniel Blaisdell, Architect

EXECUTIVE STAFF OF BRODE IRON WORKS

THE BRODE IRON WORKS, SAN FRANCISCO

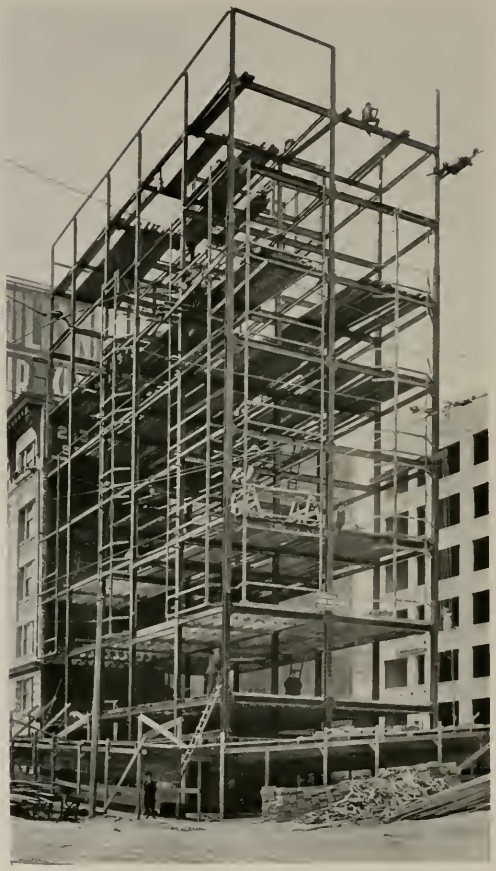
The Steel and Iron Industry of the Pacific Coast

VI. The Brode Iron Works.

By BRUCE HARLAND.

IT IS not enough to buy your steel right in order to meet the requirements of building, but care must be exercised in selecting the shop where the fabricating and framing is to be done. Any good iron works will, of course, test the steel as it comes from the Eastern mills—but this is only preliminary to the experienced and artistic fashioning which is necessary for structural and ornamental uses. In straightening out the steel, whether a "Bulldozer," lever or hammer is used, care must be exercised. Then in "punching"—to see that the dies are not too large; and in "assembling"—to see that every piece is put into its proper place and enough bolts used to securely hold same; and in "riveting"—to drive straight and perfect heads and lastly, in painting—to use surfacing that is not adulterated and which will stand the wear of weather, usage and time—all these are factors which contribute to the success of the finished job.

The Brode Iron Works has a record of more than a quarter of a century to recommend them to those who wish to entrust their structural and ornamental iron work to competent hands. The business was established in 1886 by Mr. R. J. Brode, and for a number of years was known as Brode and Clark Iron Works, having their shop and works at 621-623 Howard street, San Francisco. They were incorporated July 7, 1913, as the Brode Iron Works, with the following officers: President, W. R. Brode; vice-president, R. J. Brode; secretary, Louis R. Holm. At this same time they moved into their own shops and office at 31-37 Hawthorne street, running through to Tehama street, being far superior to the old location, with an entirely new equipment of the latest and most modern machinery for handling structural steel work. The shop enjoys the convenience of being in the heart of the city, being within two blocks of the Palace Hotel.



EIGHT-STORY CLASS A HOTEL
POST AND TAYLOR STREETS, SAN FRANCISCO
PHILLIP SCHWERDT, ARCHITECT

CLASS A GARAGE FOR G. P. W. JENSEN, SAN FRANCISCO
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ROEDER BUILDING, SAN FRANCISCO
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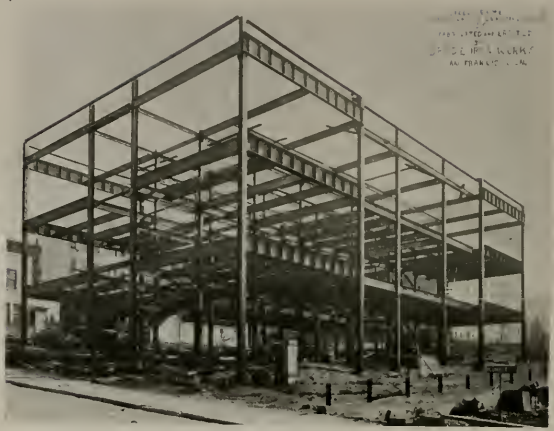
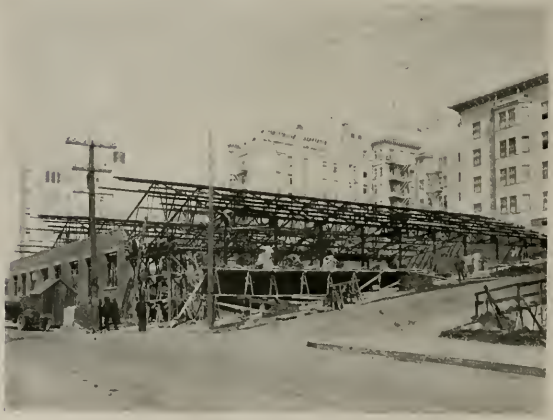


STEEL FRAME SPRING VALLEY GRAMMAR SCHOOL, SAN FRANCISCO



DENMAN GARAGE, TAYLOR AND BUSH STREETS, SAN FRANCISCO

LOS ANGELES ARCHITECTURAL CLUB ATELIER WORK—A FOUNTAIN
By Frank Rasche

Their special lines of work are fabricating and erecting all classes of structural steel for class A and class C buildings, steel and iron bridges, all classes of ornamental iron work, such as store fronts, fire escapes, ornamental grilles for doors and windows, etc.

Among the recently erected buildings for which they have furnished the structural steel may be mentioned the seven-story apartment house at Post and Shannon streets, Frederick H. Meyer, architect; 8-story apartment house at Turk and Leavenworth streets, A. W. Burgren, architect; class A steel frame garage, Bush and Larkin streets, for G. P. W. Jensen; class A Bishop Garage, at Jackson and Van Ness, O'Brien Bros, architects; 8-story apartment house at Post and Taylor streets, Philip Schwerdt, architect; Berkeley fire house; Marconi wireless station at Bolinas; Denman Garage at Bush and Taylor streets; Mission high school; Spring Valley, John Swett, Glen Park, Marshall and Washington Irving public schools. Also, they have contracts for about one hundred gasoline supply station frames, to be located at different points throughout California.

They point with pride to the following among the many architects for whom they have supplied steel, and this list reads almost like an architectural blue book: A. W. Burgren, T. Paterson Ross, Mathew O'Brien, Frederick H. Meyer, MacDonald & MacDonald, A. A. Cantin, Henry C. Smith, Reid Bros., Herman Barth, N. Blaisdell, Wm. Mooser, Edgar A. Mathews, Sylvain Schnaittacher, Albert Pissis, Henry Shermund, Rousseau & Rousseau, Carl Werner, J. R. Miller, Wm. H. Crim, Jr., L. B. Dutton Co., John J. Foley, Chas. C. Frye, Carl Geilfuss, Havens & Toepke, B. J. Joseph, O'Brien Bros.

The Brode Iron Works report a busy shop and a bright outlook for Fall business, which is certainly a tribute to their high reputation and to the energy of their executive force.

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Architect and Engineer
OF CALIFORNIA

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IF EVERYBODY PAID, TIMES WOULDN'T BE HALF BAD

Yes, times are hard, there is no mistaking the matter at all and collections are simply horrible; everybody is hanging on to every penny he can grab not knowing what may be ahead. If each one would loosen up a bit and pay at least some of what he owes, the situation would quickly change and we'd all be wondering what had happened. The old illustration of the single dollar's efficacy is a good one. A owed B $2.00, B owed C $2.00 and C owed A $1. All were hard-up but A, realizing the silliness of "hoarding," and having managed to get $1.00, pays it on account to B, B does the same and takes that dollar and pays it to C, on account; C, with the same dollar, pays A in full, with which A wipes out his indebtedness to B, and B his to C, so that that single dollar has cleaned up five dollars of debts and still keeps agoing. The thing is to have confidence in the future and pay out to the last penny, keep things moving and all will be well.

Discussing the prevailing dullness, Mr. F. W. Fitzpatrick, the well-known consulting architect of Washington, D. C., writes this magazine as follows:

One thing that convinces me that times *are* hard (if I were not absolutely certain already) is the number of churches I have to do. In 1907 and the several panic periods —about seven years apart, that preceded it —I was amazed at the number of churches and Masonic Temples and charitable institutions that were put up. Peculiar, isn't it? One would think that in periods of depression subscriptions to churches and such would be the first to be lopped off and I can't offer any reason for it's not being so, but the fact is there. In 1907 there were few, mighty few, business structures or State buildings or other big work going on, but of churches there were legion.

Today it's the same story, churches and more of them, but with the addition of banks. More banks have passed through my hands in the past few months than in as many years before. There's a regular epidemic of little banks, institutions that have done business, a good business, for years in old tumble-down shacks, suddenly perking up and wanting to put on front in a new, modern (and generally classic—ye gods!) building on the best corner in town.

I used to think that perhaps it just happened so, merely a coincidence that I was having a run of churches and banks, as at some other time I might have a period of court houses and office buildings, but the building reports show that there really is an unusual "boom" in churches. Today there are under contract over $42,000,000 of churches in the country, $6,400,000 in New York alone!

WHAT IF THERE IS A WAR?—BUILD NOW

A great war, a most unnecessary and senseless, but none the less terrible war is raging, but, thank Heaven, we're not right in it. So what's the use in stopping all the wheels of commerce just to sit around and discuss that war?

Of course it's baneful influence is bound to be felt even here. There is no European capital available to us, their markets are closed to us, we have friends and relatives in the conflict but, withal, it seems as if we spend much good time in useless babble about it when we could better be occupied skirmishing around trying to get into new markets, using the capital we do have in improving our plants and getting ready to supply the products and manufacturers that Europe will be clamoring for just as soon as this conflict is over, in a few weeks, months at most.

We stand around marking time instead of improving our opportunities, and when the mess is over Europe will get busy and resume its international business just where it left off—its recuperative power is amazing and will surprise us—and all the advantages that were within our grasp will have been lost to us.

Just now, labor here is easy, materials are cheap, contractors are anxious for work to keep going and it's the time of times for those who intend to build and have money, to get in and do so. But they won't; they'll sit around and discuss the war, telling how they'd do it if they were bossing the job (!) and, bye and bye, when it's all over and things are booming and everything is just as high as it can be, they'll be tearing their shirts to get started and they will pay the top prices for everything. A simple-minded, one-idea folk we are anyway!

IN TIME OF PEACE

The other day a manufacturer was advised to postpone his advertising until the present "psychological" depression had passed. He said:

"No. If building operations are quiet now, that means that architects, engineers and contractors are not so busy and have more time to read and digest what I say to them in my ads. When they get busy again, they'll have my information in their minds."

Good common sense from a sound, practical business man who believes in his product, in the dominating influence of architects in the building field and in advertising. He believes that by telling a straightforward story about his goods in the advertising pages of architectural journals, he will create among architects the same confidence in his goods that he himself feels. And he is right.

* * *

A big contractor came into our office the other day and inquired for the address of a certain supply house. In his hand he carried a copy of the Architect and Engineer of back date.

"Things have been a little slack," said the builder," and I've been reading over some of my old books. I saw this ad. (he pointed to a half page display) and these people carry just what I want, but they are no longer at the address given, and I cannot find their ad. in any of the late issues."

The firm in question is still in existence—that's all you can say for it—occupying undesirable quarters, with a boy manager who "knows it all," and doing NO ADVERTISING.

With the Architects and Engineers

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Next Convention City—Seattle.

Plans for Santa Clara County Booth at Panama-Pacific

Architect William Binder of San Jose, has completed plans for the Santa Clara County booth in the California building at the Exposition. The plans call for quite an elaborate structure costing several thousand dollars. A feature will be a red brick floor over the whole area. The work is being done for the Board of Supervisors of Santa Clara County.

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September Meeting of San Francisco Society of Architects

The regular monthly meeting of the San Francisco Society of Architects was held at the University Club, California and Powell streets, on the evening of September 16th. There were twelve members and three guests present.

The Committee on Education reported that all of the San Francisco men who had been at the Ecole des Beaux-Arts in Paris at the commencement of the European war had returned to San Francisco.

It was called to the attention of the Society that while the Architectural League of the Pacific Coast had held a competition and awarded the Paris scholarship to Peter Webber, apparently no effort had been made as yet to raise the money.

The Committee on National Parks reported that they had communicated with Mr. Mark Daniels regarding the possibility of placing the design of work done in the National Parks within the scope of the National Fine Arts Commission.

Mr. Coxhead spoke on the subject of the evening, "The Development of the Foot of Market Street." He had prepared sketches showing the present streets and the traffic conditions, and a suggestion for their betterment. After Mr. Coxhead's talk there was a general discussion of the subject.

Captain Taylor of Sydney, Australia, who is commissioned by the Australian government to investigate city planning conditions in this country, gave an interesting talk on the architectural situation in Australia, particularly the competition for the capital city which was won by Mr. Walter Burley Griffen of Chicago, who had been, largely through the efforts of the Australian architects, appointed Supervising Architect. The competition for the first of the buildings in the capital, a Federal Parliament House, is about to be held. This competition, like the original competition for the city, will be open to the world.

Changing the Old Call Building

Plans have been completed by Architect John R. Miller, of San Francisco, for extensive alterations to the Claus Spreckels building, otherwise known as the Call building, at Third and Market streets, San Francisco. The basement, first and second floors were formerly occupied by the San Francisco Call. Since that paper's removal to its new building, the quarters have been vacant. It is proposed to tear out the entire first and second floors, including the concrete and stone work, and put in metal store fronts on both Market and Third streets. There will probably be a dozen stores. The new street frontages will change the general appearance of the building not a little. The second floor will be rearranged into offices. Plans are also included for alterations to the interior of the Spreckels building annex, which adjoins the Call building. All the offices will be modernized, and the corridors will be lightened, and the floors tiled.

New Church for Richmond

Architect J. C. Narbett is preparing plans for a frame and plaster church Parish House and School for the First Christian Church, Richmond. The building will cost about $16,000.

Model School Buildings for Exposition

Architects Norman F. Marsh of Los Angeles and W. H. Weeks of San Francisco have been appointed a commission to prepare plans for model school buildings to be erected on the grounds of the Panama-Pacific Exposition. The work will be done under the direction of the commissioner of education of the exposition. It is planned to remodel a school building now on the Exposition site and to erect a domestic science building, a manual training building and a model rural school. It is the intention to make these schools a feature of the educational exhibit of the Exposition. School will be conducted daily and the buildings will be open to the public, the object being to illustrate in a practical manner advanced methods of education.

Oakland-Berkeley Educators to Exchange Views

The Board of Education of Oakland will join the Berkeley board in an organization of board members of the bay cities for the purpose of discussion of school problems, new buildings, and school activities of various kinds.

A committee to assist in working out the details of such an organization has been appointed as follows: C. L. Taylor, superintendent of grounds, buildings and equipment; J. W. Gregg of the University of California; Oscar Prager, landscape gardener; J. J. Donovan, supervising architect; A. C. Barker, superintendent of schools, and Miss Ethel Moore of the Playground Commission.

Engineering Contractors' Society

The Pacific Coast Society of Engineering Contractors has been permanently organized in Los Angeles, with the following officers:

President—Geo. F. Pennebaker, of Bent & Pennebaker, Los Angeles.

Vice-president—W. S. Russell, of Russell-Greene-Foell Co., Los Angeles.

Secretary-Treasurer—Frank C. Ayars, editor of "Southwest Contractor," 505-6 Douglas Bldg., Los Angeles.

San Francisco Firm Low Bidder

The Clinton Fireproofing Company, Mutual Bank building, San Francisco, submitted a low bid of $134,000 and has begun construction of a reinforced concrete and steel bridge over the Yuba River on D street, in Marysville.

Stockton Masonic Temple

Stockton.—The Masons have bought the Fanning property, 100x100 feet, at the northwest corner of Channel and Sutter streets, upon which will be erected a temple some time next year. No architect has been selected.

Declines to Pay Non-Certificated Architect

George A. Ballou, the Visalia capitalist, who is involved in a large number of suits in the Tulare county superior court, has answered the complaint of Architect H. Y. Davis, who is seeking to collect $369.60, his fee for preparing the plans for the Ballou building in Visalia. Ballou contends that Davis is not entitled to collect for the plans, as the architect was not registered, nor did he notify Ballou that he was not a registered architect at the time he drew up the plans.

Architect Wants Pergola Law

Whether pergolas shall be allowed on roofs of frame dwellings is being debated by the San Francisco supervisors' Public Buildings Committee, whose members are divided. It arose at the request of A. Reinhold Denke, who says many persons whose homes overlook the Exposition and bay wish to build them. He suggests a building law amendment permitting pergolas to occupy one-third of the roof area, and to be eight feet in height.

Architect Weeks Busy

Besides two school buildings under construction in Santa Cruz, Architect William H. Weeks of San Francisco has completed plans for a $10,000 Carnegie library in South San Francisco, a $12,000 addition to the Woodland library, a reinforced concrete county jail at Woodland, and a model school to be erected on the grounds of the Panama-Pacific Exposition.

Will Design Detention Home

Architect Louis C. Mullgardt is preparing plans for the new Juvenile Detention Home. The selection of Mr. Mullgardt was made by the San Francisco Board of Supervisors on recommendation of the consulting board of architects.

New School for Dixon

An invited competition is being held for plans for a $60,000 school house at Dixon. Among the architects asked to compete are Woolett & Woolett, Chas. Kaiser, Henry C. Smith, and C. H. Cheney, all of San Francisco.

County Hospital Group

Architect R. A. Herold of Sacramento in completing plans for a group of county hospital buildings to be erected in Sacramento at an estimated cost of $500,000. The buildings will be class A and will be put up in units as money is available.

Personal

Walter Wood, who has been Bliss & Faville's head draftsman for a number of years, is now a member of the staff of Louis Hobart, Crocker building, San Francisco.

Architects Reid Bros, of San Francisco, have opened a Los Angeles office at 306 Douglas Building to better handle the construction work on the 10-story and basement steel frame office building now under way for Hulett C. Merritt of Pasadena.

Architect J. Martin Haenke has forwarded from New York his resignation as a member of the Southern California Chapter of American Institute of Architects. Mr. Haenke now has an office at 610 Architects building, New York City.

Aurele Vermeulen, landscape architect, has returned to Los Angeles from a five months' trip to the East and has reopened offices at 516 Byrne building.

Architect L. B. Dutton of San Francisco who has designed some of the best bank buildings in California, is not at all well and has announced his intention of retiring from active practice November 1st, for a period of one year, or until his health is improved.

Architect Lester S. Moore has closed his office in Los Angeles and has removed to Riverside, where he will engage in the practice of his profession. His Riverside address is 596 Blaine St.

Clarkson Swain, for thirteen years with the late Albert Pissis, architect, of San Francisco, has associated himself with Architect J. W. Dolliver with offices in the Royal Insurance building and the firm will practice architecture under the name of Dolliver & Swain.

H. Y. Davis, the Visalia architect, is now associated with W. F. Bowen, architect of Fresno, with offices in the Griffith-McKenzie building. Mr. Davis will continue to maintain his Visalia office in conjunction with the new headquarters in Fresno.

State Building Work.

Building construction to the extent of $478,000 now is going on in various sections of the State of California under the supervision of the State Department of Engineering.

In addition to the structures being erected, others are contemplated, the most important of which is the California School for Girls at Ventura, which will cost in the neighborhood of $150,000.

Of the money now being spent, the largest amount is being used for the Agnew State Hospital.

A cottage to house the female working patients will cost, when completed, $60,000, and will accommodate sixty-two persons; while the Nurses' Home for Women will cost $50,000. Both of these buildings are expected to be completed the early part of next year.

160-Room Hotel

A six-story and basement brick and steel hotel will be erected for I. I. DeHail at Market and Twelfth streets. It will contain 160 rooms and a large number of baths. The exterior will be faced with pressed brick. The plans have been completed by Architect William H. Crim, Jr., and bids will be invited for the work this week.

The same architect is preparing plans for a three-story and basement frame apartment house on Waller street, between Fillmore and Steiner streets. It will contain thirty apartments of two and three rooms, with private baths, and will cost about $35,000. An automatic electric heating system will be installed. The interior finish will be pine and hardwood. There will be a vacuum cleaning system. The extension will be covered with cement plaster.

Plumbing Extraordinary

Down at the Moose club rooms in Los Angeles, they have an attendant whose ideas of sanitary and scientific plumbing made the city inspector gasp. The inventor of the new ideas wanted a drain pipe from the buffet, so he ran one through the wall of the building and hung a tin bucket on the end of it. The theory is that when the bucket gets full it will run over and the surplus contents will surely drop on a passerby. The latter will come upstairs and tell the folks inside that they are leaking, and then George knows it is time to empty the bucket.—Exchange.

Brick or Asphalt?

The bill setting aside $180,000 for the improvement of streets in the San Francisco Civic Center, adjoining the Exposition grounds and Eleventh and Tenth streets, has been placed on final passage by the Board of Supervisors. The work will be done by the Street Repair Department, but whether the Civic Center streets shall be paved with vitrified brick or asphalt has not yet been determined.

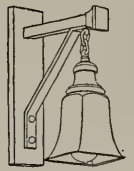
Fresno Schools

Architect Edward T. Foulkes of San Francisco and Fresno has completed plans for the Kirk Elementary school building to cost $40,000 and to contain 12 class rooms, an assembly hall with gallery, frame and plaster construction, crushed brick roof, shower rooms, steam heat, maple floors, etc.

Architect Eugene Mathewson is completing the working drawings for the Washington school, and plans will go out for figures shortly.

Position Wanted

Young man, age 20, wishes position in architect's office, in San Francisco, with view of learning business. Has had experience in high school, I. C. S. course, and atelier of S. F. A. C. Oliver Johnson, 997 Dolores St., S. F.



Heating and Lighting

Plumbing and Electrical Work

The Science and Art of Illumination

(Continued from September Issue)

The effect of light upon the eye involves such of the physiological actions of the organs of vision as are concerned in the normal and efficient use of these organs. The subjects of photometry and the laws of light are included, for it is only by its effect upon the eye that we know the phenomenon of light and derive our methods of measurement. This subject therefore originates in the domain of the oculist and physicist.

The appearance of fixtures is a question of the artistic design and embellishment of the mechanical devices necessary for supporting the lamp or means of converting the illuminant into light. This division touches the field of the decorator.

The esthetic and psychological effects of light refer to the light or illumination itself apart from all mechanical accessories.

From this analysis of the subject, which is really very brief although it may not appear so, it is apparent that to handle the problem of artificial lighting with such a degree of knowledge and skill as to secure the results which the client has a right to expect from his architect requires one of two things: either a comprehensive knowledge of all of the different branches of science and art above enumerated on the part of one person, or the co-operation of a number of different engineers and artisans and the intelligent co-ordination of their work. There is no denying the fact that there are too many cases in which neither of these conditions are fulfilled, with the result that many of the lighting installations are not what they should be, either from the economic or artistic standpoints.

The greater of the evils is undoubtedly lack of co-operation among the several classes of artisans concerned with the subject, and the failure of the architect to properly co-ordinate their work. It is not a century ago that the entire field of science was included in the term "philosophy," and the "philosopher" was supposed to know all that was knowable about the entire scheme of the universe. But so enormously has this knowledge increased that today one might devote his life to mastering some phase of the subject whose very existence was unsuspected a generation ago.

The same general condition applies to the profession of architecture. Building was, until recently, a comparatively simple operation. But few materials entered into the construction and the methods of placing these materials were correspondingly simple. The building when finished was only a shelter, more or less magnificent in its proportions and elaborate in the surface decorations. The knowledge covering the various materials and the methods of assembling them were well within the scope of one man's knowledge; in fact, the physical details were so few that the architect's best energies could be given to the artistic elements of the problem.

Hence it is that architecture as an art was developed to an exceedingly high state during these ages of the simple life. But today the accessories of the building demand a greater range of knowledge than the mere structure itself; in fact, a range of knowledge far too great to be compassed successfully by a single individual if any time and energy is to be left for a consideration of building as an art. The architect has therefore become what the word signifies, the *master builder*, to a greater extent than ever before in history. The architect whose survey of the general principles concerning the elements entering into the modern building is sufficient to enable him to direct and co-ordinate all of the branches of artisanship involved, and who succeeds in producing a consistent unit from this multitude of parts has not only fulfilled his mission, but has displayed a much higher order of talent than did the architect of old. It is therefore no reflection whatever upon the architect's ability or knowledge that he employs engineers or specialists for securing all of the different utilities required in the modern building. The only cause for shame is when the finished structure shows that the master failed to properly co-ordinate the work of the different artisans.

Artificial lighting perhaps suffers more than any other facility from lack of this co-operation. To be more specific in our criticism a case may be taken which recently came within the writer's observation. The building is one of the large

structures known in this city as "loft buildings," and is located in one of the new wholesale dry goods districts; so that it was reasonably certain that it would be used for this line of business. The location of the light-sources as indicated by the electric outlets had evidently been determined by making them symmetrical with reference to the general plan of the steel construction. In some cases the elevator shafts and stairways had interfered with this symmetry and a part of the outlets that would naturally be required for illuminating the space were omitted. Entirely regardless of the location of these outlets a sprinkler system had been so installed that in many cases the water pipes came either directly under the outlets, or so close to them that the fixture could not be placed in the position provided. The outlets were so few in number that, except on the ground floor where very powerful units could be used, it was necessary to provide numerous new outlets by means of wires run in molding. These new outlets far exceeded in number those originally provided, and many of those originally provided were unavailable on account of their position. In the basement not only were the outlets too few, but their capacity was so small that it was necessary to install a supplementary panel board and run three new lines of conduit in order to get enough light for the purpose for which the basement was used. The selection of the lighting fixtures and their purchase was left to the tenants.

Here was a plain case of lack of co-operation between the structural engineer, the electrical engineer, the fire protection engineer and the architect. While it was manifestly impossible for the architect to foresee just how each tenant would arrange his shelving and tables it was morally certain that such shelving and tables would be installed, and the provision of a sufficient number of outlets to meet these requirements with a minimum of changing of positions should have been provided.

Another case in an entirely different class of building will illustrate the subject still further. This was a high class apartment house. In one of the principal rooms only wall outlets had been provided, thus requiring the use of brackets alone for illumination. Two of these locations came in such a position that they were behind double doors leading into the room when these were left open, which was their natural condition. The brackets used were French sconces with imitation candles consisting of miniature electric lamps. In the other principal rooms the light-sources provided could have furnished only a very inadequate illumination. Here was lack of co-operation all around. The fixtures in themselves were handsome pieces but they were entirely inadequate to their purpose, showing lack of co-operation between fixture manufacturer and architect; while the location of the outlets so that they came behind doors showed a lack of co-operation between architect and electrical engineer.

Competition for Fireplace Heater Design

The American Gas Institute and the National Commercial Gas Association have authorized payment of a prize of $150 for the best design of a fireplace heater, burning gas.

There are several types of heaters on the market which are fairly satisfactory from the standpoint of heat production, but do not meet the requirements from the standpoint of appearance. The committee wants a design of a heater that may be placed in the open fireplace of the library, living-room or dining-room of an artistically furnished dwelling, which will be appropriate for the purpose, and artistically consistent with the furnishings of the room. The appearance when unlighted, is of equal importance with the appearance when lighted, and in awarding the prize, these two features will be given equal prominence.

The award will be made by the committee on the recommendation of a jury composed of three members, an architect (to be nominated by the American Institute of Architects), a member of the American Gas Institute and a member of the National Commercial Gas Association.

The competition will close on March 1, 1915, at which time the designs must be in the hands of the Chairman of the Joint Committee, Mr. Wm. J. Serrill, 1401 Arch Street, Philadelphia, Pa., who will supply any further information desired.

The Plumber

By WALT MASON

WITH stately stride the plumber comes, and stays around a while and plumbs. He gives the boiler sundry slaps, and tinkers with the pipes and taps, and when he leaves my humble place a smile of gladness lights my face. For he has made a modern shack of my abode, which, three weeks back, was such as people used to own along about the age of stone. For years I bought all kinds of pills to cure my relatives of ills. My old granny had the heaves, and swallowed tea of boneset leaves, year after year, and still felt punk, with daily spasms in her trunk. My aunt wish every breath she drew, and though I was foundered, and she knew green pains bought her pails of dope, the poor old girl was shorn of hope. My Uncle Hiram's rheumatiz just kept him muttering, "Gee whiz!" And everyone around the shack had pink lumbago in the back. And then the Wise Man came along, and said, "You'll ne'er be well and strong, you'll always have the grievous gripes, until you put in modern pipes." The plumber came, with lead and brass, and freed the place from sewer gas, and sprung some sanitation curves—and gets the praise that he deserves. Now granny has no fell disease; she's swinging on the high trapeze; my aunt can take a fall from Gotch in seven minutes by the watch; my Uncle Hiram, rid of aches, can whip Jack Johnson in three shakes.

Copyright George Matthew Adams.

The Editor's Mail

Questions on Any Branch of the Building Industry Will Be Answered Here

An Opportunity for Electricians

To THE EDITOR: The following letter has been addressed to electrical contractors and supply men throughout the United States, and we will appreciate your printing it in the Architect and Engineer:

While the American manufacturer cannot possibly regard the present condition existing in Europe as in any way a condition to be desired, at the same time it brings him face to face with an opportunity which he should in all justice to himself take advantage of, namely, the cultivation of the foreign market from which, for the time being, European competitors have withdrawn.

After the war is over, the European countries will borrow money from the United States and pay back a goodly portion of the money so borrowed for American made supplies of all kinds. This will be the natural result of the cessation of production in Europe, but no one can predict when the end of the war may be.

At the present time, there is a great South American market left open by withdrawal of European competition, and your attention is drawn to the possibilities of that market.

If interested, The Society for Electrical Development will be pleased to secure for you whatever information it can, and if you desire literature translated into Spanish for circularizing South American countries, the Society will have that done, charging you the actual cost of such service.

Another feature to be considered is to what extent our American manufacturers can help each other in the matter of producing electrical supplies heretofore imported from Europe. What, for instance, have you been importing?

Possibly The Society for Electrical Development can find an American manufacturer willing and able to make what you have heretofore been procuring from abroad and if so, we will be very pleased to render you this service.

Yours very truly,
L. M. WAKEMAN,
General Manager.

A Good Opening Here for Slate Quarry

MERCED, CAL., Aug. 31, 1914.

To THE EDITOR: If I am not asking too much from you I should like your opinion as to the probability of a slate quarry in central California paying, provided the quality was as good as the Pennsylvania product. This is also supposing that there are large quantities of the slate and within short haul to the railroads.

The point is, do you think there would be a good demand for it?

Very truly yours,
CHAS. D. MARTIN, C. E.

There is unquestionably a splendid field on the Pacific Coast for slate products. Just at present there is no competition for this material, and the one concern now handling it seems content to take the business as it comes without going to the expense of advertising or employing a large force of salesmen. Many architects who would use slate are now specifying other materials because of the absence of competition. If you can get hold of a good quality slate, and have it properly marketed, there is money in it for you and your sponsors.

Eastern Brick Firm Wants to Locate in California

LITTLE FALLS, MINN., Sept. 16, 1914.

Gentlemen: I am looking for a suitable location in the west for the making of brick, my intention being to increase the capacity to meet demand, and starting at 15,000 daily output. Have you any towns in your State looking for such an industry, and where the clay is good, transportation good, fuel cheap and labor reasonable?

I would like to get in touch with those places to learn of actual conditions and what they are willing to do to secure this plant.

Yours very truly,
P. O. DUCLOS.

A Tax on Firms Doing an Interstate Mail-Order Business

To THE EDITOR: We find that in all lines of business, including building materials, that there are a few firms in a few large towns, wishing to do business everywhere without paying state, county or city taxes, except in the large towns where they have their headquarters, and ship from other points to your state and city, and in this way avoid a tax, which we think should be paid; that is, your state, county and city tax.

We have endorsed House Record Bill No. 5308, which we are endeavoring to get the next Congress to pass. With the passing of this bill, it would place all things equal, so that the local merchant, in every line, could compete with the out of state merchant. If there is not a law of this sort passed, we are of the opinion that it will not be very many years before practically all of the business is done from a few large centers, and that those towns and cities will gradually increase in population, while towns of less than 500,000 population will as surely decrease on account of business leaving them.

This will be caused, we think, from the local merchant's being taxed, while the firm in another state doing business everywhere, only pays taxes in one state. It, therefore, will be harder for the local merchant to compete with the out of the state men, and make money out of their business.

Yours very truly,
H. KAY HOWSE,
Secretary Retail Furniture Dealers' Association,
Nashville, Tennessee.

How to Patch a Concrete Floor

To THE EDITOR: Please give me a "receipt" for satisfactorily patching a cement floor.

CEMENT CONTRACTOR.

Cut down the worn place at least one and a half inches. This cutting should be carried into the strong unbroken concrete and the edges should be cleanly undercut. The bottom of the cut should then be swept out, clean-blown out with compressed air or a pair of bellows, if available, then thoroughly wet and scrubbed with a broom. In this way, small loose particules of broken material which the chisel has driven into the surface are removed. A grout made of pure cement and water about the con-

sistency of thin cream, should be scrubbed into the pores with a broom or brush, both at the bottom and sides of the cut. Following this a stiffer grout, about the consistency of soft putty, should be thoroughly compressed and worked into the surface, which has already been spread with grout. Finally, before the grout is set a mortar made of one part cement to one part crushed stone or gravel, consisting of graded sizes from ¼ inch down to the smallest excluding dust, should be thoroughly mixed and put in place, then floated to a proper surface. Cover with wet bagging, wet sand, sawdust, or other available material. All trucking should be kept off and the surface kept thoroughly wet for at least one week or ten days.

If a particularly hard surface is required, 6-penny nails are sometimes mixed with the mortar, and other nails stuck into the surface when the patch is finished. This will produce a surface which is extremely hard and durable.

Automatic Sprinklers Stop Fire

An actual demonstration of the fire stopping power of automatic sprinklers was recently given in Edmonton, Alberta. All those who saw the test were deeply impressed with the work of the equipment, a roaring fire being extinguished in 29 seconds.

The Public School Board of Edmonton with several public officials went to the T. Burns plant to inspect the Grinnell equipment there. A small outlying building was fitted with a sprinkler system, piled high with shavings and soaked with kerosene. Fire Chief Lauder applied the match and in an instant the building was a mass of flames. In just 12 seconds the sprinklers opened and that was the end of one of the hottest little fires Edmonton has ever seen.

Speaking of the test, Fire Chief Lauder said:

"I consider that sprinkler installations should be compulsory in all theaters, hotels, hospitals, schools and buildings where the public meets. They should also be in all larger office buildings and warehouses where business is done. Ninety-nine per cent of the fires that do heavy damage would never get started if a sprinkler system were installed. The system pays for itself in the saving of insurance in from three to six years, and I cannot understand why more people do not install it."

The Grinnell sprinklers were used in the above test.

A "Safety First" Suggestion

An interesting bit of "Safety First" work has been put in practice by the proprietor of a garage in Louisville, Kentucky.

Motor vehicles leaving this garage are obliged to cross the sidewalk of a busy street along which pedestrians are passing all hours of the day and night, and as a warning lamp has been installed in front of the exit in a large globe, on each side of which the word "Danger" is painted in large letters.

This lamp is lighted from sunset to sunrise and in itself forms an effective cautionary signal. It is, however, supplemented by a loud-ringing gong, which is automatically operated whenever a vehicle approaches the exit door, a steel plate being so placed that it automatically closes the contact with a copper spring and rings the bell whenever the wheels pass over it.

It has been suggested that local authorities would do well to enforce the installation of such a device at the entrance to every garage located on busy thoroughfares.

We can hear the din now that such an installation would make in the Golden Gate and Van Ness Avenue garages in San Francisco.

Bond Required of Contractor

The amount of the bond required on a contract is in many cases unnecessarily large. At the present time especially, an excessive guarantee requirement on work of any great size will curtail the competition from contractors. The failure to receive any bids a few weeks ago on a $3,500,000 municipal improvement (Twin Peaks tunnel) was ascribed largely to the fact that a bond of one-half the contract price was necessary. A bond of $1,750,000 under any condition is a pretty good-sized undertaking. Just now, in view of the unsettled state of affairs resulting from the European war the underwriting of such a sum would be a somewhat difficult proposition. In this particular case the project has been readvertised and in bond requirement reduced to $500,000, which should be amply sufficient to safeguard the city from any damage resulting from the failure or delay of the successful bidder in carrying out the work.—Engineering-Contracting.

Confidence

The non-advertised product in any line is constantly being compelled to submit to comparison with the advertised product. The advertised product has become the accepted standard of value. The advertised product establishes itself in the confidence of the buying public because its manufacturer is willing to endorse it openly and stand back of it. It represents the greatest value for the money because a manufacturer with the confidence of the public back of him is enabled to manufacture on a basis of highest efficiency.

Reviews of Recent Books

of Interest to the

Architectural and Engineering Professions

By CHARLES HENRY CHENEY

The Appreciation of Sculpture, by Russell Sturgis.

To comprehend sculpture, whether Greek, Roman, Renaissance or Modern, is a problem to most of us. Yet one has but to read this most entertaining and well illustrated historical and critical review, which discusses many of the best examples from each period, to obtain a deep insight into the art. The author has interpreted form, sentiment, and monumental effect as shown in recent art, which is ably compared with the Greek standard.

Mr. Sturgis says: "The hope of any fine art is in the singleness of purpose of its workmen. . . . The public must learn that only artistic work is to be had from an artist, and must really stop asking him for moral suggestion, archaeological information and general exhortation." While not new, it is certainly a book to stimulate further delving into the history and criticism of sculpture.

Published by the Baker & Taylor Co., Union Square, New York. 235 pages, 64 illustrations. $1.50 net.

Ancient Rome and Modern America, by Guglielmo Ferrero.

How many architects and engineers wish for a better understanding of life as it is today to guide them in their constructive work! Here is a volume of essays which goes far to help us understand ourselves. It discusses with much brilliancy of suggestion the tendencies conspicuous in Roman society and the comparative tendencies in America of today. Mr. Ferrero says: "We find in ancient civilization, many phenomena that today are specialties in American society, phenomena to be sought in vain in European civilization."

From the discussion "What is Progress" to the "Riddle of America," there is a most interesting and keenly critical appreciation of the problems of bossism and extravagance, the growth of big fortunes, concentration in big cities, the cost of living, and the quantitative ideal.

Published by G. T. Putnam's Sons, New York. 352 pages, net $2.50.

Housing Problems in America—Proceedings Third National Conference on Housing, 1913.

With the ever increasing demand upon architects and engineers for advice on city planning, this volume of papers on the recent problems of Garden Cities, Co-operative Housing, How to Get Cheap Houses, The Problem of the Old House, Housing of Employees at Industrial Plants, Transit and Housing, and Public Health Administration and Housing, bring to hand a most valuable collection of information. The inclusion of the discussions on these papers at the conference, taken part in by some of the best known experts of the country, gives additional sidelights on housing problems that make these publications of the National Housing Asociation most necessary to those who are trying to keep up with recent developments.

Published by the National Housing Association, 105 East 22nd Street, New York City. Cloth, $2.00, postpaid.

Architectural Terra Cotta — Standard Construction.

A book of details and working drawings in carefully drawn plates showing best methods of terra cotta jointing and construction, which well shows the draftsman how to handle any type of construction from windows to domes, and arches to anchors. It should do a great deal to standardize and make better the specifications and drawings for all architectural work where terra cotta is used.

Published by National Terra Cotta Society, New York. Cloth, $5.00.

Other Books Received.

The House In Good Taste, by Elsie de Wolfs. Century Co., New York. Review later.

The Psychology of Management, by L. M. Gilbreth. Sturgis & Walton Co., New York. $2.00. Review later.

Pencil Sketching, by George W. Koch. Prang Co., New York. Review later.

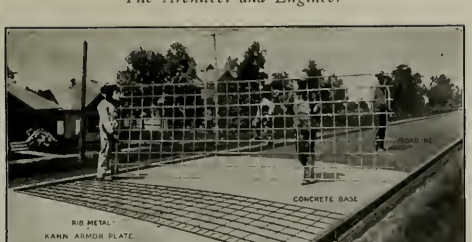
Minerals in California, Bulletin No. 67, State Mining Bureau.

National Fire Prevention Convention, Philadelphia, 1913. Merchant & Evans Co., Philadelphia. $1.00.

Annual Report United States Supervising Architect, 1913. Published by the Treasury Department.

Architect-Tonics, Tales of Tom Thumbtack. Wm. T. Comstock Co. Review later.

Social Forces in England and America, by H. G. Wells. Harper, New York. Review later.



Rib Metal for Reinforcing Concrete Pavements and Roads

Owing to their character, concrete pavements should be reinforced with steel, particularly in roads of any width. The reinforcement serves two purposes: To overcome the effects of expansion and contraction, and to prevent cracks caused by inequalities in the sub-soil.

Proper reinforcement for concrete pavements must combine both transverse and longitudinal members, the greater area of steel being across the pavement. The reinforcing must be rigid, so that it cannot be displaced during construction and so that the slack portions will not allow cracks to form before tension occurs in the steel. In order to save labor and time on the job, the material must be in such shape as to be easily handled and placed. According to the Trussed Concrete Steel Company of Detroit, its manufacturers, rib metal meets all these requirements simply and effectively.

"Rib metal is expanded from a special rolled section of the highest grade of open hearth steel. It consists of a series of nine straight bars, or ribs, rigidly connected by cross ties formed from the same section of steel. The cross ties accurately space and thoroughly anchor the main bars in the concrete.

"Rib Metal is essentially a bar reinforcement, consisting of nine straight bars handled in one piece. This saves labor and assures accuracy in placing. The ribs span in a straight line, supplying the reinforcement in the direct line of greatest strain.

"Rib metal is stiff and rigid, not pliable and wiry. When placed in the concrete it stays where it is placed. The ribs, being in a direct line with the strain, do not tend to assume other positions, and there is no straightening out of kinks with resultant cracks in the pavement. There is no unrolling, holding in place, or cutting to length on the job.

"Rib metal is furnished in sheets up to 64 inches wide and 25 feet long."

Fresno a Live Building Town

(Special Correspondence)

FRESNO, Cal.—All the architects here are busy.

Architects Swartz, Hotchkins & Swartz, Rowell building, have let a contract to A. Allen of 259 Blackstone street, Fresno, to build a two-story brick building for the San Joaquin Baking Company, to cost $40,000. The building will be erected on property of the United Warehouse Company, and will be 50 x 130 feet with concrete foundations and floors and pressed brick exterior. There will be four large ovens installed with oil-burning equipment.

The same architects have let contracts for the resumption of work on a two-story store and lodge building for F. M. Roessler, 125 x 150 feet, and containing six modern stores with quarters for Fresno Lodge of Elks on the second floor. Construction will be of brick and reinforced concrete.

Mrs. M. Berry Goodwin, daughter of Mrs. Fulton G. Berry, owner of the Fulton hotel, which was destroyed by fire recently, is arranging to have the hotel rebuilt and is now negotiating with a San Francisco architect to do the work. The new building will be seven stories and Class A.

Supervising Architect W. D. Coates of Fresno's new schools, reports that contracts are about to be let for the construction of the Webster school from plans by Messrs. Coates & Traver. The building will cost $55,000. Construction will be brick with asbestos stucco exterior and clay tile roof, 264 feet long and 40 feet wide, one story high, 13 class rooms, steam heat with oil burner, clock system, vacuum cleaning, maple floors, fireproof corridors.

Revised plans for the Jefferson school have been completed by Architect J. Carl Thayer and are now in the hands of contractors for bids. This building will be two stories, of brick, tile and terra cotta and will cost approximately $22,000.

State, County and Municipal Engineering
Good Roads—Water—Sewers—Bridges—Fire Protection

Maintenance of Oil Macadam Roads in San Joaquin County, California*

By FRANK EUGENE QUAIL, County Engineer, Stockton.

IN ATTEMPTING to address an audience consisting, for the greater part, of members of the Boards of Supervisors of the various counties of our state, on a subject pertaining to the maintenance of highways, I do so with the full knowledge of the fact that as members of the Board of Supervisors of your respective counties, you are charged in your official capacity with the custody of the major portion of the public highways, and that many of you have a wide experience in the construction and maintenance of the same. You may, perhaps, differ with me on some points regarding the maintenance of oil macadam roads. Still it is hoped that you may also be able to obtain some benefit in being made conversant with the methods practiced in San Joaquin County; for by discussion and an Exchange of ideas along any line, we are enabled to obtain practical information and to broaden our viewpoint.

In beginning, I cannot refrain from referring briefly to some roads other than oil macadam, with which you all have to do.

California, in common with other states, has many hundred miles of earth road, in fact a great majority of the mileage of the highways of our state is what is known ordinarily as earth roads. They will necessarily remain such until their importance makes it necessary that a more permanent type of road be constructed.

Careful attention to the grading of such roads is an important item, as a properly constructed grade once built is a permanent asset. In fact, the grade and concrete or stone culverts and bridges are the only permanent part to any road, as road metal will wear out and must be repaired, but the grade, permanent culverts and bridges remain indefinitely, except in case of severe floods.

The surface of these earth roads once properly graded can best be maintained by an intelligent use of the steel road drag, commonly referred to as the split log drag. The result obtained by even a slight attention to this method will bring gratifying results to those who have occasion to use such roads.

Next in importance in point of mileage is, perhaps, the gravel and crushed rock or water bonded macadam roads. This class of road serves a good purpose, and under many conditions, are the economical road to construct, cognizance being taken of local conditions, and the importance of the road to be improved. Close attention to the proper season for making repairs and the "Stitch in Time" method, will usually make these very satisfactory roads. Where the climate is suitable, watering has been found to be one of the best means of maintaining a smooth and satisfactory surface, and where such conditions do not obtain, owing to long, dry, hot summers in the interior valleys, one or two applications of fuel oil of about 16° to 18° gravity, has been found to accomplish the nearest result to the application of water, especially in its dust laying qualities. The oil should be applied at about one-quarter (¼) gallon per square yard for each application.

Of the more permanent type of road are the brick pavement, bitucrete or asphaltic concrete, concrete plain, or with blanket surface, as well as oil macadam, of which I shall particularly speak.

It will be necessary for me to state something of the method of construction used in building oil macadam pavements in order that you may more fully understand our methods of maintenance.

Our oil macadam roads are constructed by the penetration method upon a gravel or water bonded macadam base, depending upon the character of soil over which the road is to be constructed. We have found that over heavy adobe soils, a gravel base from four to six inches in depth has given the best results, while on less heavy soils, and the sandy loams, either the water bonded macadam or gravel base has been used, depending upon the availability and cost of the material.

The oiled macadam wearing surface is constructed by spreading one and one-half

* Paper read before the Supervisors' Convention, Merced, California.

(1½) inch crushed rock over the base to a depth of from one and one-half (1½) inches to two (2) inches, the depth varying according to the importance of the road and class of construction desired. This course of stone is then rolled until no more compression is possible, and a firm uniform surface is obtained, but the surface must be open, and free from filler to permit the penetration of oil.

Heavy asphaltic oil is then applied uniformly at the rate of one-half (½) gallon to three-quarters (¾) gallon per square yard of surface. The oil should contain at least 80 per cent of asphaltum and is applied hot at a temperature of not less than 220° F. It is applied with an oiling machine that automizes the oil and forces it on under pressure, completely covering the exposed surface of the rock. The oil is then covered uniformly with a clean washed gravel or stone chip dressing of one-half (½) inch and under in size, and of sufficient quantity to absorb the oil and fill the interstices in the rock wearing surface. The dressing is then rolled into the wearing surface and is broomed with stable brooms or rotary street brooms while the rolling is in progress. The covering with dressing, sweeping and rolling is continued until all voids are filled and the oil has been absorbed. Care is taken during rolling that the surface is sufficiently covered in all places, that oil will not stick to the roller.

The pavement is then swept clean of all excess dressing and a second coat of oil applied at the rate of three-quarters (¾) to one-half (½) gallon per square yard of surface. This oil is then covered with dressing and rolled as in the application of the first coat. The rolling and sweeping continues until the surface is smooth and unyielding, and all the oil is absorbed.

The road is then thrown open to traffic for a period of three (3) weeks or longer, depending on the weather and the amount of travel using the road, when a third coat of oil of from one-quarter (¼) to one-eighth (⅛) gallon per square yard is applied, covered with dressing and rolled as described for the previous applications. When completed, the road presents a smooth uniformly bitumenized surface. At this stage, the road is turned over to the care of the Highway Maintenance Department.

The system of highways improved by the bond issue in San Joaquin County under the well known "Savage Act," was begun in October, 1909, and by January, 1912, one hundred twenty (120) miles were completed, and turned over to the Board of Supervisors, who are charged, under the law, with their care and maintenance. Since that date, the entire system of some two hundred thirty-eight (238) miles has been completed, and together with thirty-three (33) miles improved by the Boards of Supervisors from the road funds of the county, has all been turned over to the care of the Highway Maintenance Department.

A resolution was adopted by the Board of Supervisors specifying that the entire system should be maintained as a unit, and that the direction of the work be placed under a suitable, competent single-head, who should have charge of the supervision of the work, and accounting of the funds, after a consultation with the members of the Highway Commission, Good Roads Club and Advisory Board, it was decided that the County Surveyor was the logical official to take charge of such a work, and the resolution passed, empowered him to organize the department for the prosecution of the work.

In February, 1909, in accordance with this resolution, as County Surveyor of San Joaquin County, I proceeded to organize the Highway Maintenance Department of San Joaquin County. The County Surveyor is the official head of the department, next in charge and directly responsible to him is an assistant engineer who has charge of a second assistant and an accountant. All patrolmen are responsible to the second assistant engineer.

The equipment found necessary to carry on the work consists of road rollers, auto trucks, oil spraying machines, oil wagons, water wagons, dump wagons, spreader wagons, portable heating boilers, road graders, steel road drags, rotary street brooms, scarifiers and other minor equipment.

In order to keep the equipment under cover during the winter moonths, a corporation yard, warehouse and sheds are provided, and all machinery and equipment are placed in good repair in our own shop, at times when they are not needed on the work. Our methods of maintenance may be described under the following separate heads:

1st. Maintenance by Patrolmen.
2nd. Maintenance by Gang System.
3rd. Maintenance by Auto Patrol.
4th. Maintenance by Prison Labor.

A patrolman is placed in charge of from twelve to fifteen miles of road. He is paid $90.00 per month, and he must furnish a horse and a one-horse wagon, of low running gear, capable of carrying at least two thousand pounds, and arranged to carry a twenty-five gallon oil heating furnace. He is required to put eight hours of work each day upon the roads under his charge. He is furnished with an oil heating furnace, 1 pick, 1 mattock, 1 rake, 2 shovels, 1 cast iron tamper, 1 Tarco pouring pot and 1 stable broom. The heavy asphaltic road oil which the patrolmen use in the work of patching is kept in underground wooden tanks of capacity varying from one-hundred fifty (150) barrels to three hundred (300) barrels, located along railway sidings at points convenient to the roads under his patrol.

These tanks, while used by the patrolman, where available, were constructed to

accommodate the larger repair and reconstruction outfits.

Where railway sidings are not convenient to roads under charge of patrolmen, small under-ground pits or tanks having a capacity of twenty-four (24) barrels, are constructed. Oil for the patrolmen's exclusive use is delivered to these pits in tank wagons as needed.

The rock material for patrolmen's use is placed in piles of three or four tons each, four or five hundred feet apart, on the edge of the grade so as not to be in the way of traffic.

His chief duty in the warm weather of spring, summer and fall consists of keeping the sealing coat of oil macadam highways intact. No attempt is made to use heavy asphaltic oil or to do any patching work whatsoever—in which oil is required—during cold, damp, rainy weather. His procedure in work of this class is as follows:

When he notices a spot or place upon the surface of the roadway where the sealing coat has worn through or been removed by any cause, leaving the rocks exposed, he first cleans the spot thoroughly of all dust and dirt by means of a suitable broom, places a thin coat of hot, heavy asphaltic oil over the surface of the exposed rock, and covers the same with rock screenings or fine pea gravel in sufficient quantity to absorb the oil. The heavy asphaltic oil sticks to the surface of the exposed rock and unites along the edges with the old sealing coat where the same has not been worn through, and forms a patch which seals the surface.

In places where the sealing coat has not been worn through, but depressions have developed, his methods of procedure are as follows:

The depression is first cleaned by broom of all dust or fine material, and then given a very light coat of heavy asphaltic oil, after which rock is placed in the depression in sufficient quantity to bring the surface nearly to a level of the surrounding pavement. The size of the rock to be used varies from three-quarters (¾) inch to one and one-half (1½) inches in size, according to the depth of the depression. The surface of the rock is then given an additional coat of oil covered with fine material to absorb the same. It is thoroughly tamped, which operation completes the process.

Where reasonable care is exercised by the patrolman in making these repairs, the resulting surface of the patch after a few weeks wear is such that it would require close observation to detect where it had been made, so perfectly does it unite with the rock and the adjacent surface.

On water bonded macadam highways, the patrolman's chief duty consists in keeping all hollows or depressions filled with cementing road gravel, fine rock or rock screenings. The patrolmen have various other duties, such as keeping earth shoulders along the edges of the oil macadam highways well drained so as not to allow any water to penetrate under the edge of the pavement to the subgrade, cutting all obnoxious weeds, keeping the roadway clear from rubbish, the water-ways open for drainage, etc. In fact, a good patrolman need never be at a loss to know of some work to do that will improve the condition and appearance of his road. Care is taken that good reliable men are selected for this work. Men of judgment that do not wait to be told to do a thing before they act. They are selected with a view of keeping them on the work, as they become more valuable to the department by reason of their experience. Their work is inspected by the County Surveyor, first or second Assistant Engineer from time to time, but the patrolman does not know when such inspection of his work will occur.

All patrolmen are required to render daily reports to the office showing the road or roads upon which they have been working, nature of the work performed and the amount of material used.

A patrolman is not expected to maintain the mileage of roadway given him, exclusive of other assistance. Whenever the condition of any road is such as to require a complete sealing coat, or the defects in the surface become too numerous for him to repair without neglecting other portions of the patrol, a larger outfit is used to make the necessary repairs.

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When the first oiled macadam highways were constructed, it was estimated that the sealing coat over the surface of any such road would require renewal at least once every two years, but we have demonstrated to our satisfaction that with the use of a competent patrolman on a road that has been properly constructed, it will not be necessary to renew the entire coat oftener than once in three or four years.

We have many sections of road that have been in use for three seasons, and the sealing coat is still intact and apparently as good as when constructed. We have been able to maintain this condition principally through the use of the patrolmen.

(Concluded in the November Number.)

Bonding Asphalt to Concrete

Among the several problems to be met in the recent construction of the concrete reservoirs in San Francisco was that of bonding asphalt to concrete. According to B. N. Abbott, in a letter to Engineering Record, after making unsuccessful attempts to apply the asphalt direct to the concrete in various ways, the expedient of first painting the surface with coal tar was tried, and it was found that when applied in this way under right conditions the asphalt would adhere so firmly that after it had cooled it could not be broken away without bringing pieces of concrete with it. Mr. Abbott states that in order to secure this result the concrete surface was first scrubbed clean with a bristle brush, and over this a thin coating of hot coal tar was "painted." The coal tar should be heated in small quantities, brought just to the boiling point and then applied immediately. Heating the coal tar in large quantities, which necesitated some delay before it could all be used, did not give such good results, and the gangs were therefore not allowed to heat more at a time than they could apply quickly as soon as it began to boil. The asphalt was spread over the tarred surface in the usual manner.

Cut-Stone Bridges

Napa county, California, has 326 cut-stone bridges and culverts, according to statements made by Jasper Partrick, a member of the Board of Supervisors of that county, at the Medford good roads convention. The material used is mostly sandstone. The new Trancas bridge at Napa has a length of 194 feet, made up of two 40-foot and three 20-foot arches, and cost $6,680; another similar bridge over Conn creek, 210 feet long, has five 35-foot arches, was built in 50 days and cost $5,960; and the Putah creek cut-stone bridge is 298 feet long and cost $19,980.

Dependable Highways

"Dependable Highways" is the title to a new monthly periodical being published in the interest of better city streets and country roads. The August issue is Volume 1, number 1. It is published by the National Paving Brick Manufacturers Association, Will P. Blair, secretary, Engineers building, Cleveland, and circulated free.

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By the Way

Some Industrial Information Worth the While

Don't Forget the Home Market

(From Printer's Ink.)

While our attention is fixed upon the momentous events on the other side of the ocean, and we are planning ways and means of shouldering the responsibility which has been forced upon us, it will not do to forget that the great majority of our citizens are going about their business just the same. The manufacturer who finds his supply of raw material approaching the danger point, or his outlet overseas blockaded; who reads in his financial journal of readjustments here, there and elsewhere; who spends his lunch hour discussing the neutrality of Government purchased ships, and gives over his evening to the censored cable dispatches; is apt to get the idea that the whole social fabric is beginning to unravel. The feeling is perfectly natural, but it is only necessary to look at the armies of youngsters marching back to school to prove that it is unfounded.

The Stock Exchange is closed; but the schools are open, the railroads maintain the same schedules, the lawyers go on trying the same cases and instituting new ones, architects and engineers are figuring specifications, bricks are laid, beams are placed, and buildings are painted, the hum of mowing machine and hinder rises from the farms. None of those things can happen without starting demand for something—shoes and clothes, iron and steel and rubber, household goods and furniture, office equipment, food products. The home market is not prostrate; at the most it is only economizing, and a policy of economy means an ultimate increase of buying power.

Of course we know that there are many people out of work, but there are indications that that condition will adjust itself—perhaps not entirely to normal, but close to it. Where some concerns are forced to suspend, others will expand.

The idea of capturing foreign markets is one that may well fire the imagination, but how many American manufacturers can claim to have captured fifty per cent, or even twenty-five per cent, of the wonderful market within our own domain? The war excitement should not be permitted to divert attention from the unprecedented opportunity to cultivate extensively the undeveloped demand unquestionably existing at home.

Architects Visit Exposed Tile House

A party of Sacramento architects and builders motored to Stockton recently to inspect a residence constructed there of Denison interlocking tile blocks, made by a Sacramento concern.

In the party were Charles Dean and O. R. Baxter from the State Architect's office, H. W. Peterson of the McGillivray Construction Company; Frank Williams, Harold Kiernan, Arthur Klein, of the architectural department of Wright & Kimbrough; Arthur P. Merrill and J. B. Phillips, respectively head of the state engineering department and the plant

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manager, and D. A. Cannon, head of the Denison Block Company.

The residence is that of R. C. Zuckerman, the San Joaquin potato king. E. B. Brown of Stockton, the architect who designed the building, was also present.

Interest has been aroused in the home because it is the first building to be erected in this locality of exposed tile, it having previously been faced with brick and stucco.

Fireproof Doors and Trim are Now a Necessity

THE basic principle of fireproofing is isolation, division, separation; protection of things beyond the immediate fire zone and preventing the fire from spreading. Fireproof doors and trim have now become a necessity in the equipment of modern buildings. As a chain is only as strong as its weakest link, so is a building only as fireproof as its least fire-resisting part, which is the wooden doors and trim commonly used.

The Dahlstrom Metallic Door Company, experts in metal doors and trim, offer the following information and suggestions to architects and others interested in fireproof construction:

By the unit form of construction and use of fireproof doors and trim, eliminating all inflammable wood, your building will be fireproof in fact, and not in name only. A fire cannot spread in such a building, and the lives of the occupants will not be endangered.

Would you use a fireproof door in a wooden partition? Certainly not!—Then why should wooden doors and trim be used in fireproof partitions? Do you realize that money spent for wooden doors and trim in a modern "fireproof" building is a poor investment? That in case of fire starting in any room they will only add fuel to the flame and be a means of the fire spreading?

Complete fireproofing simply means that wherever wood—highly varnished and thereby made more inflammable—has customarily been used, it is replaced by Metal, which can be done without the slightest sacrifice in artistic value, and with the higher first cost more than compensated for by reduced cost of insurance and maintenance.

When interested send to us for additional information on this subject.

San Juan Cement Plant Again

Once more there is serious(?) talk of reopening the old Mission cement plant at San Juan, California. It seems as if whenever the daily papers get pressed for "copy" they "frame up" a new story about the San Juan plant. Here is the latest:

From all indications the Old Mission Portland Cement Co. plant at San Juan will reopen shortly, plans having been made to install new machinery and to equip the plant in a modern manner. Only a small amount of capital is needed to put the plant again in operation, and it looks as if the needed money will soon be on hand. Frank L. Brown, president of the Palmer Union Oil Co. of Santa Maria, and other men identified with the cement plant interests, have been in San Juan during the past few days, and they announce that the plant would probably reopen at an early date.

The Hunt Engineering Co. of Kansas City will likely install $250,000 worth of new machinery and the daily payroll will amount to about $800, at least 100 new families being added to San Juan's population.

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Ohio Varnish Company's Graining Patents Held Invalid

A sweeping victory for The Glidden Varnish Company of Cleveland, Ohio, was the decision of the United States Circuit Court of Appeals at Cincinnati, Ohio, on July 27th, in the case of The Ohio Varnish Company against The Glidden Varnish Company. This was an infringement and injunction case brought by The Ohio Varnish Company against The Glidden Varnish Company in 1908 because of the alleged infringement of certain patents on a graining process and graining compound obtained by The Ohio Varnish Company.

The Glidden Varnish Company's attorneys, Messrs. James R. Offield of Chicago and R. S. Leonard of Cleveland contended from the first in this matter that the patents obtained by The Ohio Varnish Company were absolutely invalid because of prior use, and that even if the patents were held valid, The Glidden Varnish Company in no way infringed upon such patents in marketing their graining compound and in instructing the public in the use of the same.

Testimony was taken for over two years, painters and decorators of the highest standing throughout the United States testifying in behalf of The Glidden Varnish Company as to the prior use of graining compound and process.

Monson Bros. Have San Francisco City Hall Contract

Monson Brothers are doing the carpenter and mill work on the new San Francisco city hall. This is a job that many of the San Francisco contractors look upon with envy. It is one of the largest contracts of the kind ever let in California, the sum involved running very close to $175,000.

N. B.—Contractors Will Please Read

The form of agreement embodied in the contract for a large construction undertaking for a Canadian municipality contains the following sentence: "N. B. —Contractors will please read the above before execution." These words appear at the end of the document and for greater emphasis are printed with red ink. At first thought this advice would appear to be somewhat superfluous. Nevertheless, it is an excellent suggestion. Had many other contract forms contained a similar warning and had the successful bidders heeded it there would have been fewer law suits and fewer contractors going broke. A contractor will prepare his bid with the utmost deliberation and care; he will weigh every possibility and take every precaution that his prices shall be right, and then when he secures the work and it comes to the important part of the whole proceeding—the signing of the papers—his only thought will be to find the blank spaces where he is to put down his name. The warning "Contractors will please read" might well appear at the beginning, in the middle and at the end of every agreement form.—Engineering and Contracting.

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D. E. Fryer & Co..... ..... Seattle, Wash.

Twin Peaks Tunnel Contract

The contract for the construction of Twin Peaks tunnel, in San Francisco, one of the biggest engineering feats ever undertaken by a municipality for suburban traction purposes, has been awarded to Hans Pederson of Seattle, for $3,475,300. According to the requirements of the Board of Public Works the work must be completed in 1,000 days.

In filing his proposal with the Board of Public Works, Pederson complied with all the requirements. Accompanying the bid was a certified check for $350,000.

Bonds to the amount of $500,000 and $200,000 for the performance of the work and protecting material and labor employed on the big project were filed together with the certified check accompanying the bid.

Something About Bickel's American Keene Cement With Specifications for Use of Same

ARCHITECTS and builders throughout the country are demanding a better and more enduring plastering material.

After years of scientific development, experiment and demonstrating, the basic fine American (Bickel's) Keene Cement, manufactured by the American Keene Cement Company, has been proven to fill this demand.

Combined with well seasoned lime putty or good hydrated lime, in accordance with manufacturers' specifications, it produces a hard, durable plastering material, constantly increasing in strength.

Free from sulphuric acid, it does not corrode, rust or deteriorate metal lath.

It spreads freely, sets and hardens slowly, can be retempered until used, without deterioration. Water floating does not harm it. All droppings can be remixed. The batch can be mixed ten or fifteen hours before using.

Basic fine American (Bickel's) Keene Cement does not age in stock. Improving rather than deteriorating.

A one to four mixture (twenty per cent Keene Cement to eighty per cent lime putty) makes a harder, better, more enduring and cheaper wall than any ordinary hard-wall plaster and does not weaken with time or rust the metal lath.

Finished with superfine, American (Bickel's) Keene Cement, the wall becomes absolutely hygienic, and practically non-absorbent; especially adaptable to hospitals, schools and public buildings.

As a non-conductor of sound, it improves the acoustics of auditoriums, churches and public halls.

It meets the demand of architect, owner, contractor and plasterer, with an acknowledged superior quality of wall at less cost.

The following specifications are given for the convenience of architects and builders, and any further information will be furnished promptly upon receipt of request. The main office of the American Keene Cement Company is now in San Francisco (333 Monadnock Building).

Specifications—Lime Mortar Gauged with American Keene Cement

Scratch Coat: To every four (4) parts of well seasoned Lime Putty or Hydrated Lime, add one (1) part Basic Fine American (Bickel's) Keene Cement. To this mixture as a whole, add three (3) parts of clean, sharp sand with plenty of good hair and mix in a mixer until a thorough mix is obtained. Remix mortar as often as desired.

Brown Coat: To every four (4) parts of well seasoned Lime Putty or Hydrated Lime, add one (1) part Basic Fine American (Bickel's) Keene Cement. To this mixture as a whole, add four (4) parts of clean, sharp sand and mix until a thorough mix is obtained. Re-mix mortar as often as desired.

White Finish: To every one (1) part Superfine American (Bickel's) Keene Cement, add one (1) part of clean, well seasoned Lime Putty. Mix thoroughly and allow mortar to stand at least one hour before applying. Re-mix mortar as often as desired.

Sand Finish: To every one (1) part Superfine American (Bickel's) Keene Cement, add one (1) part of clean, sharp sand. Mix thoroughly and allow mortar to stand at least one (1) hour before applying. Re-mix mortar as often as desired.

The finished surface shall be brought to a true plane and all angles must be true, and the job finished in a thorough workmanlike manner.

All walls and brick as well as tile surface must be swept clean and the masonry, wood-lath and concrete, wet immediately before applying.

Lime used in finishing must be guaranteed not to pop.

Quantities and Covering Capacity

Scratch and Brown Coat:
4 sacks Basic Fine American (Bickel's) Keene Cement.
6 bbls. of lime putty (3 bbls. dry lime).
18 bbls. sand (3 tons).
3 bales (15 lbs.) Manila Fibre.
Will cover 100 sq. yds. scratch brown coat on Metal Lath.

White Finish:
300 lbs. of Superfine American (Bickel's) Keene Cement.
300 lbs. of Lime Putty or Hydrated Lime.
The above will cover 100 sq. yds.

Sand Finish:
400 lbs. of Superfine American (Bickel's) Keene Cement.
400 lbs. of clean, sharp sand.
The above will cover 100 sq. yds.

Grant Gravel Company Are Pioneers in "Concrete Mixed" Gravel

The Evansville Sand & Gravel Co., Evansville, Ind., are supplying a new commercial commodity which they have christened "Concrete Mixed." It consists of sand and gravel thoroughly mixed together in the proper proportions for concrete work. All that the purchaser has to do is to add the cement and water and stir it up. The advantage to the buyer comes in not having to buy the materials in their various sizes separately and then trusting to chance in getting them mixed in the proper proportions. In the structures of the Big Four Railroad in southwestern Indiana the engineers provided with specifications for this "Concrete Mixed" so as to secure a proper proportion of the aggregate, which they considered to be most important in getting satisfactory concrete work. The Evansville Sand & Gravel Co. worked it out for them very satis-

BENNETT BROS.
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factorily and the result more than paid for the effort in the quality of the concrete made from this material and it amounted to a pronounced economy on the job. The Evansville Sand & Gravel Co. have in this way introduced the most intelligent plan yet devised for furnishing concrete material.

The above article, taken from a late issue of Rock Products and Building Materials, is a strong indorsement of the merits of "Concrete Mixed" gravel. While this is a new commodity in the eastern states, the Grant Gravel Company, with pits at Pleasanton and Healdsburg, has been producing "Concrete Mix" material for several years, and owing to the quality and economy in using this aggregate in the proper proportion the company has established quite an extensive trade. The mix is guaranteed to contain not over 27 per cent of voids.

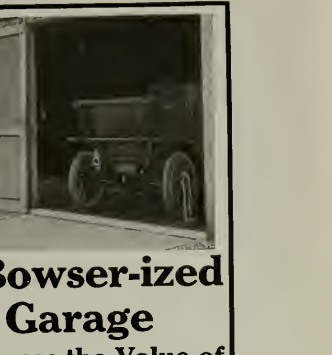
It has been used on many of the largest buildings in San Francisco and also is indorsed by the U. S. Government and used in the Federal buildings at the Presidio. The California State Highway has used the mix in some of its best work with very satisfactory results.

The Grant Gravel Company operate the largest plants in California, and are the pioneers in the production of gravel in all different grades for concrete work, road work, and for walks and roofing, having introduced the material for all these different uses, and their business has grown to such proportions that they are running their plants to full capacity in order to fill the orders which they have on file.

Cleaning Stone Work

A builder had a contract involving the use of brick work with granite trimmings and he found it necessary to clean the stone work. He made the attempt with dilute acid, but it did not give satisfaction, although the stock brick around the trimmings cleaned up very nicely. The granite, however, still showed the streaks of dirt. He stated his case in a recent issue of The Painters' Magazine and the suggested remedy was as follows:

Builders' acid, which is equal parts of muriatic acid and water, will remove spots of mortar on brick or stone work, but is not the right material for cleaning stone that is begrimed from smoke and dirt. To accomplish this, apply to the surface, with a long-handled fibre brush, a strong solution of caustic soda or pearl ash. Let it remain on for about fifteen minutes, then wash several times with clear water, using a stiff brush or broom for the purpose. If this will not be effective enough, scrub the stone with a stiff fibre brush, using soft soap and concentrated lye and sand, allowing this to remain on the stone until nearly dry, then rinse with clear water, using a brush to remove the cleansing material.



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1225 S. Olive St., LOS ANGELES, CAL.
39196 Thomas St., Fort Wayne, Indiana

A Bungalow Heater

THE Hoffman Heater Company of Lorain, Ohio, which has maintained a direct factory branch in San Francisco for nearly a year, reports a great many calls for its new bungalow automatic water heater. It is fully equipped with a thermostat valve, together with all the other automatic features contained in the higher priced Hoffman line of water heaters. The mechanical features, coupled with its low price, should make it, the manufacturers state, a very desirable specialty.

Economy in operation consistent with the utmost possible efficiency is the basic principle on which this heater is constructed, it is stated. The heater is built with a double cast iron shell with a 7/8-inch dead air space between the jacket, and the double doors above and below are self-closing. It is impossible for a down draft to blow out the pilot, it is pointed out, because of a deflecting plate in the top casting.

The coils, which are tested to 300 lbs. pressure, according to the manufacturers' description, are made of the highest grade 18 gage seamless drawn copper tubing and are wound so as to produce the greatest possible efficiency. The improved type of Hoffman thermostat, which acts on the water valve instead of on the gas valve, is a part of the equipment of this new heater. The construction of this thermostat is claimed to be as simple as it is positive in action.

Manager Arrowsmith reports the following recent installations of bungalow heaters: R. H. Roth, M. Marks, Dr. Beattie, Mrs. De Hepburn (two), Panama-Pacific Exposition Company (eight), Frank Grenis (seven), M. B. Backerand, all of San Francisco and J. B. Ashcroft of Alameda.

The Hoffman has been made the official heater of the Panama-Pacific International Exposition.

Where Germans Ought to Be Happy

This picture of the German Club in the city of Mexico is significant in several ways. It was taken a few weeks ago, and shows a very attractive enamel, and is apparent that Senor Carlos Wreidt, the Glidden distributor in Mexico did not permit the unsettled conditions that have prevailed there to interfere with his efforts in the way of having an excellent job done.

It is interesting to note that Senor Wreidt was successful in having Glidden goods used to a large extent throughout Mexico during the entire struggle between the Constitutionalists and the followers of Huerta. Such an achievement indicates remarkable ability on the part of the distributor or extraordinary merit in the commodity that he handled, or both.

But where were the Germans when the picture of their handsome club was taken? No doubt they had gone out to look at a bulletin board for the purpose of learning how their kinsmen overseas were progressing in their war against the allies. It cannot be supposed that they had deserted their unusually attractive looking club for any less serious purpose.

War Will Affect Architects' Supplies

The European war, if long protracted, will affect to a great extent the architects and engineers of this country. Much of the tracing paper used by architects and vellum used by engineers, also the best quality of draughting instruments are imported. The best quality of tracing paper is made in Germany, while vellum is of English manufacture. The embargo on exports due to the war cuts off importations and users of these articles have been notified by importing firms that the supply in the United States is not very large. Should the war be prolonged, supply will be exhausted and American make, which is inferior in quality, will have to be used.

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The "Boudoir" Combination Bath Fixture

Architects and the plumbing trade in general are taking considerable interest in a new combination fixture now being marketed by the Improved Sanitary Fixture Company of Los Angeles. It is called the "Boudoir" bath and one of the chief things claimed for it is the great saving of floor space. In hotels or apartment houses, this is an important item, being the means in many cases adding one or more extra rooms to a floor. The bath room need not be large, but even a small room will permit of the installation of a large combination outfit, where in the case lavatory and bath are installed separately, either a much larger room is necessary, or the tub must, of course, be very small.

The waste pipe from the lavatory passes horizontally and vertically to and through the outlet end of the tub just below the rim and thence downward through the regular tub waste which is of the usual type where plug and chain are used. Only one trap is used for this device, as can readily be seen, but this is in constant use. Many buildings have a number of traps that are infrequently used, and as a consequence the trap seals become broken through evaporation. In this way a large fouling surface may become exposed to the atmosphere of a room. A single trap, serving two fixtures, such as that used in this combination, with a minimum length of waste and each having a waste pipe virtually independent to a point in proximity to the trap will be maintained more effectively in seal and will be cleaner and better secured than if two traps were used, one on each fixture, and there will be no disagreeable odor. While scientists are claiming that the odor that comes from a waste is not necessarily injurious to health, still it is neither pleasant nor comfortable to sit in a room where this condition exists.

And, lastly, what may seem a minor point, but is really of vast importance, there is an especially firm support provided by the lavatory to aid old and infirm persons in entering and leaving the tub. Even younger persons would be glad to have something to lean upon when entering the tub, and if there is something provided that can be used for this purpose, many accidents will be avoided.

Passing of a Well Known Architect.

The death of Mr. Frederick J. H. Rickon, formerly of the Rickon-Erhardt Construction Company, occurred in San Francisco early in October. Mr. Rickon was well and favorably known in architectural and building circles, and following the San Francisco fire and earthquake, he assisted in rebuilding many prominent structures. Mr. Rickon was 65 years old and a 33rd degree Mason.

French Architects Avenge Rheims Ruin.

Because German artillery shelled the cathedral of Rheims, the council of the Central Association of French Architects has decided to strike the following names from the list of its foreign corresponding members: William Dorpfeld, Berlin; Joseph Stubben, Posen; Otto Wagner, Vienna, and the corresponding associations of architects of Berlin, Vienna and Budapest.

$450,000 for County Highways and Bridges

Salinas.—A bond election to raise $450,000 for county highways and bridges will be held in November.

THE BIG-AN-LITTLE CONCRETE and MORTAR MIXER

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Current Prices of Building Materials

These quotations furnished by reliable San Francisco and Los Angeles dealers

(Names and addresses will be supplied upon request.)

SAN FRANCISCO PRICES

Common Red Brick, $6.50 per M, ex. cars.
No. 1 Pressed Brick, $35.00 to $40.00 per M; Wire cut, $35.00 per M.
No. 1 Red Pressed Brick, $20.00 to $30.00 per M.
Red Stock Brick, $12.50 per M.
California Portland Cement, C L $2.30 per bbl.; L.C.L. $2.55 per bbl.
White Cement: Atlas, $6.00; Medusa, $6.80 per bbl.
Sand and Gravel mixed, 70c per ton, F. O. B. cars.
Sand (washed, screened river sand) 75c per ton, F.O.B. cars.
Bank Sand, $1.00 per cu. yd.
Roofing Gravel, $1.40 per ton.
Crushed Rock or Gravel, 75c per ton.
Red Roofing Tile, $22.00 to $25.00 per square, laid.
Brick Lime, $1.35 per bbl., C/L.
Finish Lime, $1.50 per bbl., C/L.
Hardwall Gypsum Plaster, $9.40 per ton, C/L, ex. whse.
Oregon Pine, Rough Common, 1 x 3 to 1 x 10, $14.00.
Oregon Pine, Rough, 2 x 3 to 2- 12, $15.00.
Oregon Pine 1 x 4 T. & G. Flooring, No. 1, $35 per M; No. 2, $32; No. 3, $26.
Oregon Pine T. & G. Ceiling, No. 1 and 2 mixed, $27 to $30.
Redwood, Rough Common, 1 x 4 and up, $22.00.
Redwood, Rough Common, 2 x 3 to 2 x 10, $22.00 to $24.00.
Redwood Rustic, No. 1, $36.00; No. 2, $32.00.
Redwood Ceiling, No. 1, $32.00; No. 2, $28.00.
Redwood Shingles, No. 1, $2.80 full count.
Red Cedar Shingles, Star-A-Star, $3.00 full count.
Pine Lath, $2.85.
Metal Lath, 13 to 25c per yd., according to quality.
1 x 3 Oak Flooring, Q. S. Clear, $120.00 per M; Select, $80.00 per M.
¾ x 2½ Oak Flooring, Q. S. Clear, $96.00 per M; Select, $74.00 per M.
1 x 3 Maple Flooring Clear, $75.00 per M; Clear White, $105.00 per M.
White Lead in Oil, 8c per lb.
Dry Red Lead, 8¼c per lb.
Boiled Linseed Oil, 74c gal. Raw Linseed Oil, 73c gal.
Turpentine, per gallon, 63 to 70c in bbls.
Dry Shellac, 35c per lb., variable.
Hyloplate Blackboard, 25 to 35c per foot, installed.
Composition Flooring, 25 to 30c per foot, laid.
Genuine Slate Blackboards, 40 to 50c per foot, erected.

LOS ANGELES PRICES

Common Red Brick, No. 2, $4.50 per M.
Clinker Brick, $9.00 per M.
Pressed Brick, $45.00 per M.
Enameled Brick, $65.00 per M.
Red Roofing Tile, $12.00 and $15.00 per square (not laid).
White Cement, $6.00 per bbl.
Portland Cement, $2.30 per bbl.
Lime, $1.50 to $1.75 per bbl.
Hardwall Plaster, per ton, $9.90 ex. whse.
Oregon Pine, Rough Common, 1 x 3 up, $17.00 to $19.00 per M.
Oregon Pine, Rough Common, 2 x 3 up, $17.00 to $21.00 per M.
Oregon Pine Flooring, 1 x 4, No. 1, $40.00; No. 2, $35.00; No. 3, $22.50 per M.
Oregon Pine Ceiling, 1 x 4, No. 1, $36.00; No. 2, $31.00.
Redwood, Rough Common, $20.00 to $24.00.
Redwood Rustic, No. 1, $38.00; No. 2, $33.00 per M.
Redwood Ceiling, 1 x 4, No. 1, $33.00; No. 2, $28.00 per M.
Redwood Shingles, 4 bdls. to M, No. 1, $2.25; No. 2, $1.75.
Red Cedar Shingles, 4 bdls. to M, Star-A-Star, $2.75.
Pine Lath, 1½ in. x 4 ft., $3.25 per M; 1⅝ in. x 4 ft., $3.65 per M.
White Lead in Oil, 8½c per lb.
Red Lead, dry, 8½c per lb.
Raw Linseed Oil, bbls., 65c gallon.
Boiled Linseed Oil, bbls., 70c gallon.
Turpentine, bbls., 63 to 70c gallon.
Crushed Rock and Gravel, $1.65 per yard.
Sand, 85c per yard.

SACRAMENTO PRICES

Common Brick, $7.00 per M, C/L.
Pressed Brick, Wire Cut, $30.00 per M, C/L.
Portland Cement, $2.40 per bbl. carloads.
Crushed Rock and Gravel, 65c per ton, ex. cars.
Sand, $1.00 yd. on cars.
Roofing Gravel, $1.50 per ton.
Lime, $1.35 bbl.
Hardwall Plaster, $11.40 per ton, ex. whse.

STOCKTON PRICES

Common Brick, $7.75 per M, del.
Face Brick, Wire Cut, $31.00 per M C/L.
Cement, $2.40 per bbl., C/L.
Crushed Rock and Gravel, 90c ton.
Sand, 90c.
Roofing Gravel, $1.50 per ton.
Lime, $1.35.
Hardwall Plaster, $11.40 ex. whse. per ton.

FRESNO PRICES

Common Brick, $9.50 per M, del.
Face Brick, Wire Cut, $35.00 per M, C/L.
Cement, $2.84 per bbl., C/L.
Crushed Rock and Gravel, $1.35 per ton.
Sand, $1.35 per yd., del.
Roofing Gravel, $1.85 per ton.
Lime, $1.50 bbl.
Hardwall Plaster, $12.40 per ton, ex. whse.

BAKERSFIELD PRICES

Common Brick, $9.00 per M, del.
Face Brick, Wire Cut, $37.00 per M, C/L.
Cement, $2.77 per bbl., C/L.
Crushed Rock and Gravel, $1.80 per ton.
Sand, $1.00 per yd., del.
Roofing Gravel, $2.00 per ton.
Lime, $1.50 per bbl.
Hardwall Plaster, $13.40 per ton, ex. whse.

CHICO PRICES

Common Brick, $11.00 per M, del.
Face Brick, Wire Cut, $35.00 per M, C/L.
Cement, $2.65 per bbl.
Crushed Rock and Gravel, 85 to 90c per ton, C/L.
Sand, $1.00 per yard.
Roofing Gravel, $1.50 per ton.
Lime, $1.40 bbl.
Hardwall Plaster, $14.00 per ton, ex whse.

How to Paint Steel Tanks

Owing to the salt atmosphere and fogs from the ocean and bay in the vicinity of San Francisco, steel tanks on buildings rust very rapidly and the old system of painting or putting on a little cement coating has proved ineffective. For a number of years Biturine Enamel has been used aboard ship in the treatment of the steel ship itself and also for the tanks containing the drinking water.

Thus the introduction of Biturine for tanks ashore is not an experiment. On over forty of the largest buildings in San Francisco and Oakland the coating of tanks both on the interior and exterior with Biturine Enamel has proved a permanent saving and the best known architects are now specifying this system exclusively.

O'Connor & Moffatt, The White House, Flood, Schmidt, Commercial, Royal Insurance, Eastman Kodak, Holbrook, Merrill & Stetson, American Steel & Wire Buildings, these and many others have had Biturine Enamel applied to their tanks. Sidewalk expansion joints, concrete high pressure water proofing, swimming tanks, etc., are other places of pronounced value for Biturine.

Portland will Try "Quantity System"

It has remained for the city of Portland to break the ice and demonstrate the merits of the "Quantity System," which Architect G. Alexander Wright of San Francisco urged several months ago before a gathering of Portland architects. The Quantity System is intended to present for the use of contractors in making estimates for buildings the exact quantities of materials that are to be used, saving the builders much work and much duplication of figuring in cases where a number of bidders are competing for the same job.

The system will be tried for the first time in Portland in connection with the new city barns to be built at Sixteenth and Jefferson streets. City Commissioner Dieck and Building Inspector Plummer decided that this building offers a good chance to show the value of the system and an engineer will be detailed later to compile these figures. The figures thus gathered will be checked by another engineer, so there will be in effect two separate compilations.

If the system is found to work as is expected the smaller contractors will have a better chance to compete for large buildings because much overhead expense will be removed. Many of these contractors have no engineers on their staffs who are competent to estimate quantities of material and the system would thus be of value to them. It is estimated that the cost will be around $50,000.—The Portland Journal.

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One Hundred and Sixty-Two Hotel Fires in Ninety-Two Days

In the first ninety-two days of 1914 there were 162 hotel fires. That means a hotel fire every thirteen hours and thirty minutes. When property is burning at this astounding rate, it is not strange that a human being was killed or injured every twenty hours in a hotel fire.

Such a record of losses is tremendously serious. It is not so much that the property loss amounted to four and a half million dollars, as it is that human life is in imminent peril. Eighty per cent of these fires occurred in commercial hotels, and it would therefore seem that some of the many traveling men's associations should look into this matter and demand safety.

Five southern hotels are now announcing to their patrons by means of cards in every room, that fire safety has been secured by a complete installation of automatic sprinklers.

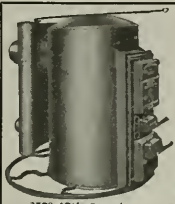
Silver Gray Stain

The Standard Varnish Works of 113 Front street, San Francisco, are no doubt largely responsible for the recent demand by builders for a silver gray stain.

Heretofore it has been a difficult task to purchase an article of this nature for the reason that where used over pine, the yellow color shows through, but their Kleartone silver gray stain when used in connection with Kleartone silver gray coater produces a very pleasing and lasting effect, as it will not fade—and the yellow color entirely disappears.

Some Slider

Theodore Meyrick, a hodcarrier, 224 Third street, San Francisco, underwent the experience of a real "slide for life," says one of the San Francisco dailies. He lost his balance on the thirteenth floor of the Clift hotel and plunged toward the ground. During the descent he grasped a steel cable and to this he clung desperately, sliding the remainder of the distance to the bottom.



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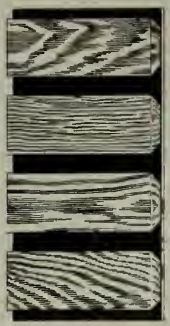

This shows the construction of stucco or plaster board—Dovetail Lath—damp proof mastic-fiber board.

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(Contributed.)

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The Premier is a complete heater in itself, and with its regulator attached or hanging on the wall nearby gives all the heating service that a radiator being a part of a large central installation can possibly do, and does it without any attention at all—no fussing about the fuel, ashes, drafts, chimney troubles, etc., etc.

The radiators are portable and are of the standard sizes. They are made either of cast iron or pressed metal, the latter are preferable for residences on account of their lightness, since the housewife will doubtless want to move them from one room to another.

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Agents Wanted

C. Roman Co., paint manufacturers in San Francisco, state they would like to arrange with parties in Oregon, Washington, Arizona, Nevada, Montana, and Idaho to act as agents for their line of paints, including the well known concrete coating, "Technola." Their address is 173 Jessie street, San Francisco.

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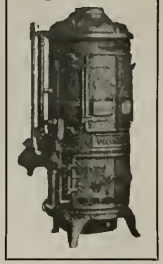

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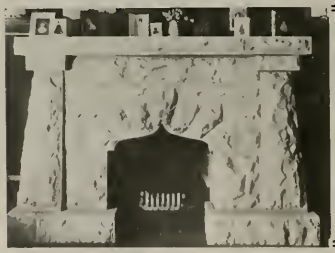

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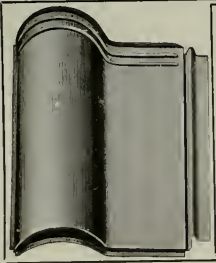

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Los Angeles Chapter Annual Meeting

The annual meeting of the Southern California Chapter, American Institute of Architects, was held at the Hollenbeck Cafe October 13th. This was the first meeting since the summer vacation and a large number of the members of the profession were present. The principal business was the election of officers for the ensuing year and the election of delegates to the Institute convention to be held in Washington in December.

Following the dinner, the meeting was opened by the reading of the president's annual address by Vice-President Albert C. Martin, who has been acting chairman of the Association during the past year on account of the death of President Robert B. Young. The Chapter voted that a letter be written to Secretary Fernand Parmentier commending him upon his patriotic action in joining the Alsatian volunteers and hoping for his safe and early return to Los Angeles.

Nominations for officers were declared in order by the chairman with the following result: Mr. Albert C. Martin was unanimously elected president; Mr. S Tilden Norton was elected to the vice-presidency; and Mr. Fernand Parmentier and Mr. August Wackerbarth were elected by acclamation and rising vote to succeed themselves as secretary and treasurer respectively. Mr. Albert R. Walker will continue as acting-secretary during the absence of Mr. Parmentier.

Mr. J. E. Allison was elected to the board of directors for a three-year term and Mr. J. J. Backus was elected to serve one year to complete the term of Mr. S. Tilden Norton, whose resignation was automatically accepted upon his election as vice-president.

For delegates to the annual convention the following members were elected: Messrs. Octavius Morgan, A. E. Rosenheim, John C. Austin, Albert C. Martin and John Parkinson; and for alternates, Messrs. Frank D. Hudson, John P. Krempel, Theo. A. Eisen, Elmer Grey, and Myron Hunt.

The board of directors reported that Mr. Alex. Curlett, of the firm of William Curlett & Son, had been elected to membership in the Chapter. Also that the resignation of J. Martyn Haenke, now in New York, had been received and accepted.

* * *

San Francisco Chapter has elected W. B. Faville president and Bakewell vice-president.

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Inasmuch as this matter has been dragging for sometime, owing to other pressing matters of importance before the Board, we would urge that you make the installation as soon as possible. While we are pleased to learn that your factory is working overtime in order to keep up with deliveries, we trust that it will not be necessary for you to hold up this order for any length of time.

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There seem to be excellent reasons for stimulating the export trade in cement as rapidly as possible, for, although the export of a relatively bulky and low-priced material such as cement does not promise large direct profits to an individual producer, indirectly the creation and maintenance of an export trade should benefit the industry at large through the opportunity afforded of disposing of surplus stocks and thereby tending to maintain steadier prices.—Bulletin, Geological Survey.

Chicago Cement Show

Announcement has been made by the Cement Products Exhibition Co., 208 S. La Salle street, Chicago, that the eighth annual Chicago cement show will be held in the Coliseum, Feb. 10-17, 1915. February is looked upon as the most advantageous season for the show. It has been found that contractors, engineers and cement users are able to attend the exhibition in that month and it is the time and when the maximum amount of purchasing and specification equipment and supplies is done.

Only one cement show will be held in 1915. The time has been shortened and arrangements have been made to give exhibitors more time both in installing and removing exhibits.

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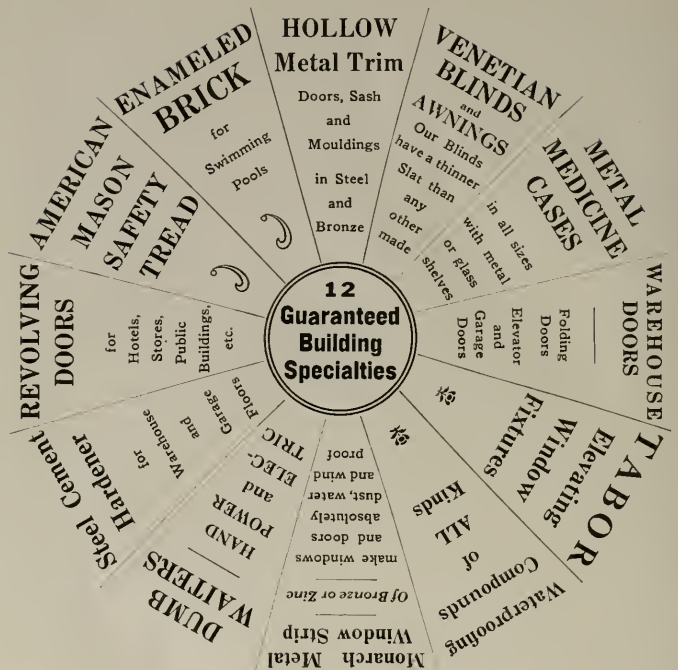

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